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Wastewater Handbook  
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United States  
Environmental Protection  
Agency

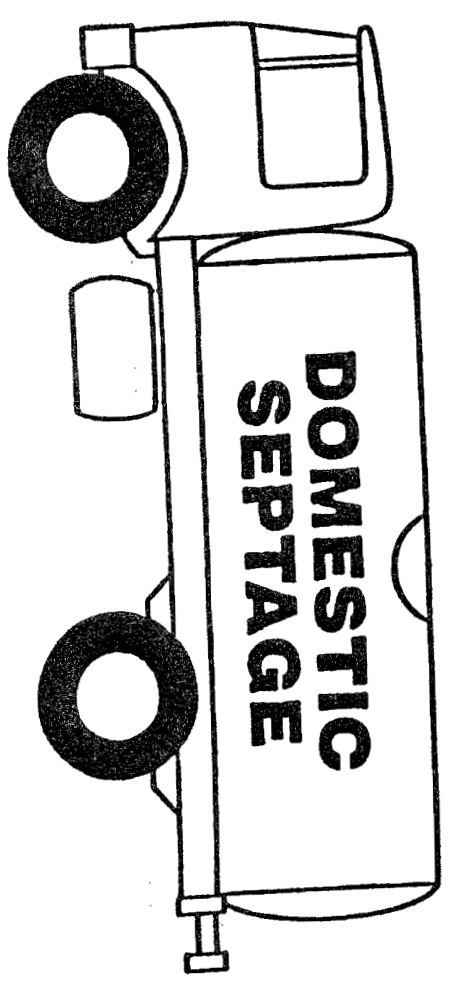
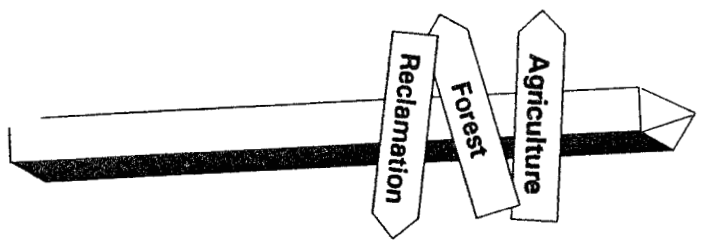
Office of Water  
(4204)

EPA 832-B-92-005  
September 1993



# Domestic Septage Regulatory Guidance

## A Guide to The EPA 503 Rule



*Excellence in compliance through  
optimal technical solutions*

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MUNICIPAL TECHNOLOGY BRANCH

ACKNOWLEDGEMENT

The authors [John Walker, Municipal Technology Branch, U.S. EPA Office of Wastewater Enforcement and Compliance, and Penny Mascaro, Engineering-Science, Inc.] gratefully acknowledge all those persons who have reviewed and made comments to improve this guidance. These reviewers include septage haulers who land apply, consultants, treatment plant operators, and regulators.



EVERY EFFORT HAS BEEN MADE TO PROVIDE ACCURATE AND COMPLETE INFORMATION IN THIS GUIDANCE DOCUMENT. HOWEVER, IT IS NOT INTENDED TO SUBSTITUTE FOR THE ACTUAL RULE.

IF YOU ARE NOT SURE ABOUT ANYTHING DISCUSSED IN THIS GUIDANCE, YOU SHOULD CHECK THE TEXT OF THE COMPLETE RULE IN 40 CFR PART 503 ENTITLED "STANDARDS FOR THE USE OR DISPOSAL OF SEWAGE SLUDGE."

THE REGIONAL AND STATE SEPTAGE COORDINATORS, WHOSE NAMES ARE LISTED IN APPENDIX A, ARE AVAILABLE TO ANSWER YOUR QUESTIONS ON THE REGULATION.

TABLE OF CONTENTS

SECTION	PAGE
<b>Overview: A Domestic Septage Guide</b>	<b>1</b>
<i>A Guide to the Federal EPA Rule for Land Application of Domestic Septage to Non-Public Contact Sites</i>	1
<i>Pathogen and Vector Attraction Reduction Choices</i>	2
<i>Use/Disposal Options for Commercial and Industrial Septage</i>	4
<i>Request for Comments on Improvement of Guidance</i>	5
<b>Section 1: Introduction</b>	<b>7</b>
<i>Why Is There New Federal Regulation of Domestic Septage?</i>	7
<i>What Is In Domestic Septage?</i>	8
<i>Purpose of This Guidance Document</i>	10
<b>Section 2: Other Use and Disposal of Domestic and Non-Domestic Septage</b>	<b>13</b>
<i>Regulation of Domestic Septage Discharged Into Treatment Facilities, Applied to Public Contact Sites, or Disposed Differentiating Domestic from Commercial and Industrial Septage</i>	13
<i>Regulation of Non-Domestic Septage</i>	14
<i>Regulation of Non-Domestic Septage</i>	15
<b>Section 3: Federal Standards for the Application of Domestic Septage</b>	<b>17</b>
<i>Introduction</i>	17
<i>Permits and Compliance</i>	19
<i>When Must I Comply With the Part 503 Regulation</i>	20
<i>Record Keeping and Reporting for Land Appliers</i>	22
<i>Determining the Allowed Annual Rate for Applying Domestic Septage to Non-Public Contact Sites</i>	22
<i>Avoiding Nitrogen Contamination of Groundwater when Land Applying Domestic Septage</i>	23
<i>Pathogen Reduction Requirements/Crop and Site Restrictions</i>	29
<i>Vector Attraction Reduction Alternatives</i>	32
<i>How to Raise the pH of Domestic Septage</i>	37
<i>Using Hydrated Lime</i>	37
<i>Using Quiklime</i>	39
<i>Using Dry Alkaline Material General</i>	42
<i>Sampling and Testing to Determine the pH of Domestic Septage</i>	43
<i>Certification</i>	44
<i>Management Practices</i>	46

SECTION	PAGE
<b>Section 4: State Rules Also Apply for Land Application of Domestic Septage</b>	<b>47</b>
<i>Deciding How to Meet Both Federal and State Rules</i>	48
<b>References</b>	<b>53</b>
<b>Figures</b>	<b>21</b>
<i>1. Record Keeping Requirements</i>	21
<i>2. Typical Crop Nitrogen Requirements and Corresponding Domestic Septage Application Rates</i>	28
<i>3. Pathogen Reduction Alternative 1</i>	30
<i>4. Pathogen Reduction Alternative 2</i>	31
<i>5. Vector Attraction Reduction Alternatives</i>	33
<i>6. Examples of Crops Impacted by Domestic Septage Pathogen Requirements</i>	35
<i>7. Certification</i>	45
<i>8. Comparison of Federal and Selected State Requirements for Land Application of Domestic Septage to Non-Public Contact Sites</i>	51

<b>Appendices</b>	
<i>A: List of State and EPA Regional Contacts about Rules for Use or Disposal of Septage</i>	A-1
<i>B: Chemical and Physical Characteristics of Domestic Septage vs. Sewage Sludge</i>	B-1
<i>C: Sample Methods for Record Keeping</i>	C-1
<i>D: Types and Sources of Safety and pH Testing Equipment</i>	D-1
<i>E: Example State Rules for Land Application of Domestic Septage</i>	E-1



OVERVIEW

A DOMESTIC SEPTAGE GUIDE

A GUIDE TO THE FEDERAL EPA RULE FOR LAND APPLICATION  
OF DOMESTIC SEPTAGE TO NON-PUBLIC CONTACT SITES

Discussed in Relationship to State Rules and Other Federal Regulations of Septage

PURPOSE

The information in this domestic septage guidance is provided to help the users and disposers of septage understand and follow a new governing Federal rule called "Standards for the Use or Disposal of Sewage Sludge" (40 CFR Part 503).

Outlined in this overview and discussed in detail in this guidance are the requirements for persons who apply domestic septage to non-public contact sites (sites not frequently visited by the public).

FIRST  
REQUIREMENT  
FOR LAND-  
APPLYING  
DOMESTIC  
SEPTAGE

To meet the Federal requirements for application of domestic septage to non-public contact sites, the land applier must assure that he/she has only domestic septage.

DOMESTIC SEPTAGE AS DESCRIBED IN THE  
FEDERAL PART 503 REGULATION IS THE LIQUID  
OR SOLID MATERIAL REMOVED FROM A SEPTIC  
TANK CESSPOOL, PORTABLE TOILET, TYPE III  
MARINE SANITATION DEVICE, OR A SIMILAR  
SYSTEM THAT RECEIVES ONLY DOMESTIC  
SEPTAGE (HOUSEHOLD, NON-COMMERCIAL, NON-  
INDUSTRIAL SEWAGE).

SECOND  
REQUIREMENT

Unless domestic septage is applied only to sites that are not frequently visited by the public, called non-public contact sites in this document, its use or disposal is regulated under 40 CFR Part 503 as sewage sludge.

NON-PUBLIC CONTACT SITES INCLUDE  
AGRICULTURAL LAND, FORESTS, AND  
RECLAMATION SITES.

THIRD  
REQUIREMENT

The land applier must manage the domestic septage so that pathogens (disease-causing organisms) are reduced.

PATHOGEN AND VECTOR  
ATTRACTION REDUCTION CHOICES

[1] Not treat the pumped domestic septage before land applying. Instead the applier must either directly inject this domestic septage into the soil or incorporate it into the soil surface by plowing or disking within six hours after application.

The applier must also assure that the land owner follows crop harvesting, animal grazing, and site access restrictions.

OR

[2] Adjust the pH of the domestic septage so that it remains at pH 12 or greater for at least 30 minutes before land applying.

The applier must also assure that the land owner follows crop harvesting restrictions.

FOURTH  
REQUIREMENT

The land applier must manage the domestic septage so that its attractiveness to vectors is reduced. Vectors are insects and rodents that can carry pathogens in or on their bodies and therefore transmit disease.

ADDITIONAL  
REQUIREMENTS

Fifth, the owner of the land where domestic septage has been applied must adhere to crop harvesting, animal grazing, and site access restrictions.

Sixth, the land applier must certify that pathogen and vector attraction reduction requirements have been met, including crop harvesting, animal grazing, and site access restrictions.

Seventh, the number of gallons of domestic septage applied per acre of land may not be more than needed to supply the nitrogen required by the crop being grown.

Eighth, the person who applies domestic septage to land must also follow the applicable rules of the State involved.

OTHER  
SEPTAGE USE  
AND DISPOSAL

This document also provides guidance on regulations that govern the application of domestic septage to public contact sites as well as its discharge into facilities for treatment prior to use or disposal. Guidance is also given on regulations that govern the use or disposal of commercial and industrial septage.

USE DISPOSAL OPTIONS FOR  
DOMESTIC AND NON-DOMESTIC SEPTAGE ON  
OTHER THAN NON-PUBLIC CONTACT SITES

[1] Septage can be discharged into treatment works for treatment as follows: Domestic septage to septage-only treatment works, or both domestic and non-domestic septage to municipal facilities that normally treat domestic sewage. This discharge is permissible provided that a treatment facility is available which will accept septage of the nature that you have and provided that all applicable State and Federal rules are followed.

OR

[2] Septage can be placed in a landfill or other surface disposal site. Again, the rules of the landfill operator and applicable State and Federal rules must be followed.

OR

[3] Septage can be incinerated. In this case, the rules of the incinerator operator and the applicable State and Federal rules must be followed.

STATE REQUIREMENTS

Finally, State requirements for the land application of domestic septage are discussed generally in the last part of this guidance document.

REQUEST FOR  
COMMENTS ON  
IMPROVEMENT  
OF GUIDANCE

The guidance provided was up-to-date at the time of printing and has been reviewed by a wide spectrum of individuals from regulatory to septage pumpers. Please let us know what you think about this document. Please offer any suggestions you might have for future improvement using the comment sheet inside the back cover of this document, or by directly contacting us at U.S. EPA, Office of Wastewater Enforcement and Compliance, Municipal Technology Branch, (4204), Washington, DC 20460.

SECTION 1

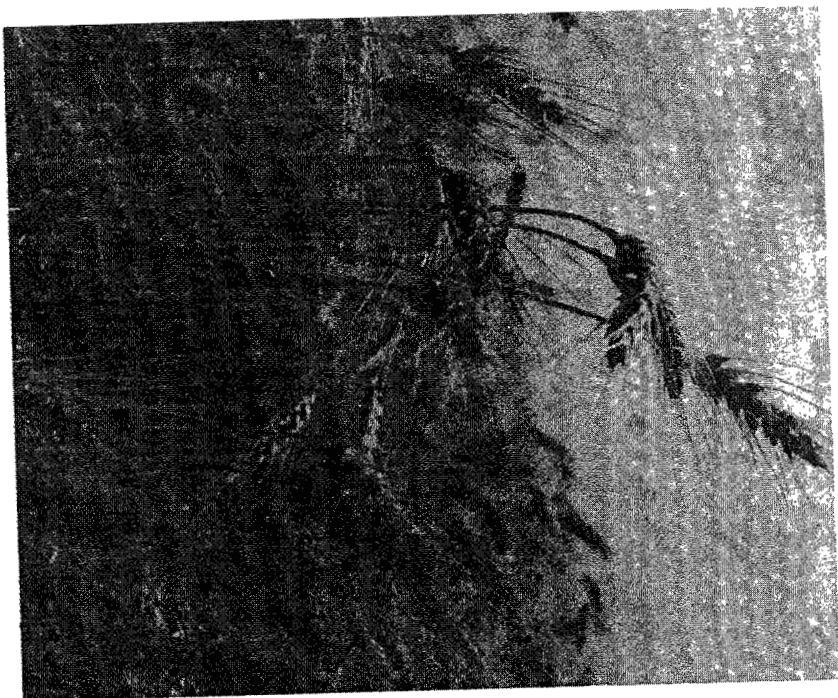
INTRODUCTION

WHY IS THERE  
NEW FEDERAL  
REGULATION  
OF DOMESTIC  
SEPTAGE?

The new Federal regulation for managing domestic septage was written in response to the Clean Water Act Amendments of 1987. This Act required that the U.S. Environmental Protection Agency (EPA) develop new rules to govern the use or disposal of sewage sludge.

"Sewage sludge" is defined in the Part 503 regulation to include "domestic septage". The new regulation is called "Standards for the Use or Disposal of Sewage Sludge". It contains standards which are designed to protect public health and the environment from reasonably anticipated adverse effects of pollutants in sewage sludge (and domestic septage). This regulation was published in the Federal Register on February 19, 1993, Volume 58, pages 9248 to 9404. It will also appear in the Code of Federal Regulations as 40 CFR Part 503. (For short we will call it the Part 503 Regulation.)

DOMESTIC SEPTAGE IS DEFINED IN THE PART 503 REGULATION AS THE LIQUID OR SOLID MATERIAL REMOVED FROM A SEPTIC TANK, CESSPOOL, PORTABLE TOILET, TYPE III MARINE SANITATION DEVICE, OR A SIMILAR SYSTEM THAT RECEIVES ONLY DOMESTIC SEPTAGE (HOUSEHOLD, NON-COMMERCIAL, NON-INDUSTRIAL SEWAGE).





INTRODUCTION

WHAT IS IN  
DOMESTIC  
SEPTAGE?

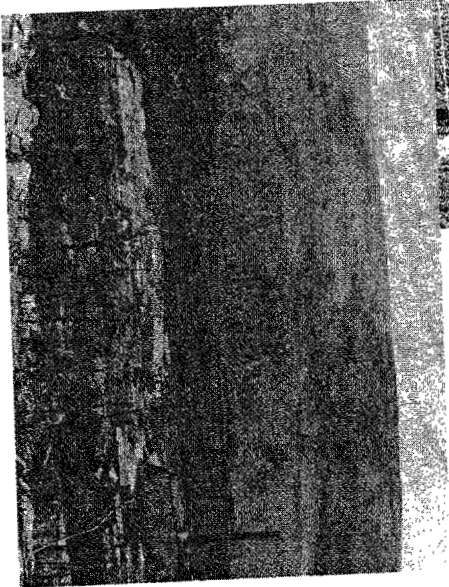
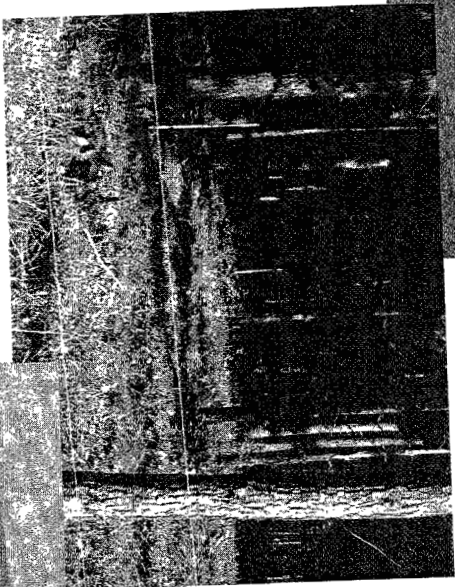
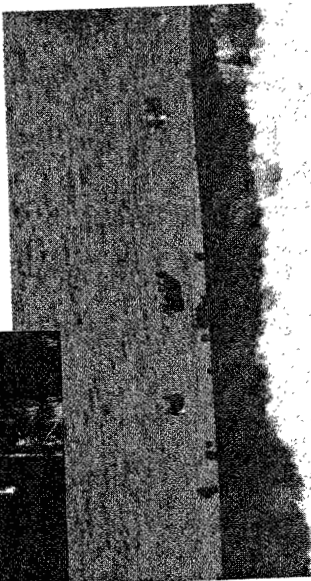
Domestic septage contains many different substances depending on the type of waste being treated in the septic system. Domestic septage contains mostly water, sewage, inorganic materials like grit, and organic fecal matter. Small amounts of polluting substances, normal to household activity, can also be present. When analyzed in a laboratory, domestic septage is usually shown to contain low levels of heavy metals and other pollutants.

Pumpings from portable chemical toilets and type III marine sanitation devices are defined as domestic septage in the Part 503 Regulation. A type III marine sanitation device is the name given to a holding tank for receiving sanitation wastes on a boat or other water-going vessel. The nitrogen content of such pumpings may be higher than in other domestic septage. This is discussed further in Section 3 of this guidance.

The most common fertilizer nutrients contained in domestic septage are nitrogen and phosphorus. These nutrients, along with certain trace fertilizer elements and organic matter, make domestic septage valuable for use on agricultural lands, forests, and reclamation sites.

Typical physical and chemical properties of domestic septage are shown in Appendix B. For comparison, typical pollutant contents of sewage sludge are also provided in Appendix B.

INTRODUCTION



Photographs provided by Ted Lyon,  
North Carolina Septage Coordinator



INTRODUCTION

The primary purpose of this document is to provide guidance to septic tank pumpers and haulers and others who apply only domestic septage to non-public contact sites.

PURPOSE OF  
THIS GUIDANCE  
DOCUMENT

This guidance to the Part 503 Regulation calls land application sites that are not frequently visited or used by the public, non-public contact sites. These non-public contact sites include agricultural land, forests, and reclamation sites.

The requirements governing land application of domestic septage to non-public contact sites are less burdensome but not less protective than the other requirements for land application of sewage sludge in the Part 503 Regulation. These less burdensome requirements are described in detail in Section 3 of this guidance document.

Land application is the spreading of domestic septage on land at controlled rates to fertilize crops and improve the tilth of soils. This domestic septage can either be sprayed or spread on the soil surface, or plowed, disked, or injected into the soil. The EPA has a policy that encourages the beneficial use of sewage sludge, including domestic septage.

INTRODUCTION

A second purpose of this document is to provide reference to Federal rules that govern other alternatives for the use or disposal of septage.

The characteristics of domestic and non-domestic septage along with other alternatives for the use or disposal of these septage materials as well as the associated governing Federal regulations are briefly described in Section 2.

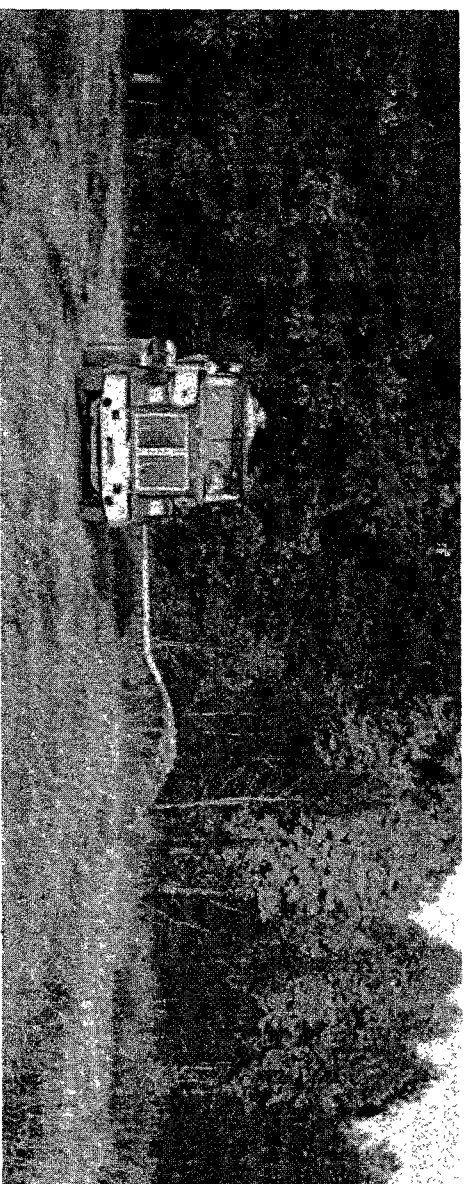
TWO IMPORTANT CONSIDERATIONS  
REGARDING SEPTAGE REGULATION:

- [1] The Federal Part 503 Regulation does not replace any existing State regulations.
- [2] The septage pumper and applier should check with State and local regulatory authorities concerning their septage ordinances.

## INTRODUCTION

A third purpose of this guidance is to discuss the relationship of the Federal domestic septage regulation to State requirements.

EPA's upcoming "Field Guide for Septage Treatment and Disposal" (4) will provide useful information about many non-regulatory aspects of septage management. The booklet should be available for distribution late in 1993 from EPA's Center For Environmental Research Information, 26 West Martin Luther King Drive, Cincinnati, OH 45268, Phone 513-569-7562.



Photograph provided by Ted Lyon,  
North Carolina Septage Coordinator

## SECTION 2

### OTHER USE AND DISPOSAL OF DOMESTIC AND NON-DOMESTIC SEPTAGE

#### REGULATION OF DOMESTIC SEPTAGE DISCHARGED INTO TREATMENT FACILITIES, APPLIED TO PUBLIC CONTACT SITES, OR DISPOSED

- (1) If domestic septage is discharged into a treatment facility that receives only domestic septage, the appropriately treated domestic septage could be applied to either public or non-public contact sites. If applied to non-public contact sites, the less burdensome rules listed in Section 3 of this guidance would apply unless otherwise directed by a permitting authority. If used on public contact sites or disposed, the applicable provisions of the Part 503 Regulation or other applicable rules, which are described below, would apply.
- (2) If domestic septage is applied to public contact sites, its use is covered by the more detailed provisions of the Part 503 Regulation for sewage sludge. Public contact sites are defined as lands with a high potential for contact by the public such as public parks, ball fields, cemeteries, plant nurseries, turf farms, and golf courses.
- (3) If domestic septage is discharged into a sanitary sewer or directly into a publicly owned treatment works that also receives municipal wastewater, the person discharging the domestic septage must first of all follow the rules of that treatment works. Then the residual solids from the treatment of the sewage sludge and domestic septage would be covered by the specific provisions of the Part 503 Regulation that apply to the sewage sludge use or disposal practice being followed or by the other applicable Federal law and State rules described below.
- (4) If domestic septage is placed in a sewage sludge-only landfill (called surface disposal in the Part 503 Regulation), or incinerated in a sewage sludge incinerator, its disposal is covered by the requirements in the Part 503 Regulation for those disposal practices.

OTHER USE AND DISPOSAL OF DOMESTIC AND NON-DOMESTIC SEPTAGE

- (5) If domestic septage is placed in a municipal solid waste landfill, its disposal is covered by the rules of the disposal facility which in turn must comply with the requirements of 40 CFR Part 258 for the disposal of non-hazardous wastes.

NOTE: The septage user or disposer must keep records of septage volumes put into any of these facilities.

DIFFERENTIATING DOMESTIC FROM COMMERCIAL AND INDUSTRIAL SEPTAGE

A separate EPA guidance document has been prepared to explain the requirements of the total Part 503 Regulation. Its title is "A Guide to EPA's Part 503 Federal Standards for the Use or Disposal of Sewage Sludge". The rules governing the application of domestic septage to public contact sites is the same as for the land application of sewage sludge. Detailed information on septage applied to public contact sites can be found in that guidance.

The term "septage" has been used to refer to many materials pumped out of various types of waste receiving tanks. It normally contains large amounts of grit and grease and can have an offensive odor.

The specific definition of domestic septage in the Part 503 Regulation does not include many of the other materials that are often called septage by the industry. For instance, grease trap wastes are not classified as domestic septage. Grease traps are used at restaurants to prevent large amounts of grease from entering the public sewer system. If you pick up restaurant grease trap wastes along with domestic septage in the same truck, then the whole truckload is not covered by the Part 503 sewage sludge standards.

Commercial and industrial septage are not considered domestic septage. The factor that differentiates commercial and industrial septage from domestic septage is not the type of establishment generating the waste, rather it is the type of waste being produced. As described above, grease trap wastes from a restaurant are not domestic septage, but the sanitation waste residues and residues from food and normal dish cleaning

OTHER USE AND DISPOSAL OF DOMESTIC AND NON-DOMESTIC SEPTAGE

from a restaurant are considered domestic septage. Likewise, only sanitation waste residues from a gasoline station are domestic septage, while wastes containing petroleum are classified as non-domestic septage.

Still another example is septage from a motel or nursing home which is considered domestic septage, provided it does not include any grease trap wastes. Dry cleaning waste residues are commercial septage, while sanitation-only waste from such an establishment would be considered domestic septage.

REGULATION OF NON-DOMESTIC SEPTAGE

It is important to emphasize again that any mixture of domestic and non-domestic septage, for example in a pumper truck or holding tank, causes the entire batch of septage to be considered non-domestic septage and not covered by the Part 503 Regulation. It is up to the individual septage pumper to determine whether to mix domestic with non-domestic septage. If not mixed, domestic-only septage would be regulated under the provisions of the Part 503 Regulation. If mixed, the septage mixture would be regulated as outlined below.

Hazardous wastes are also excluded from the definition of domestic septage.

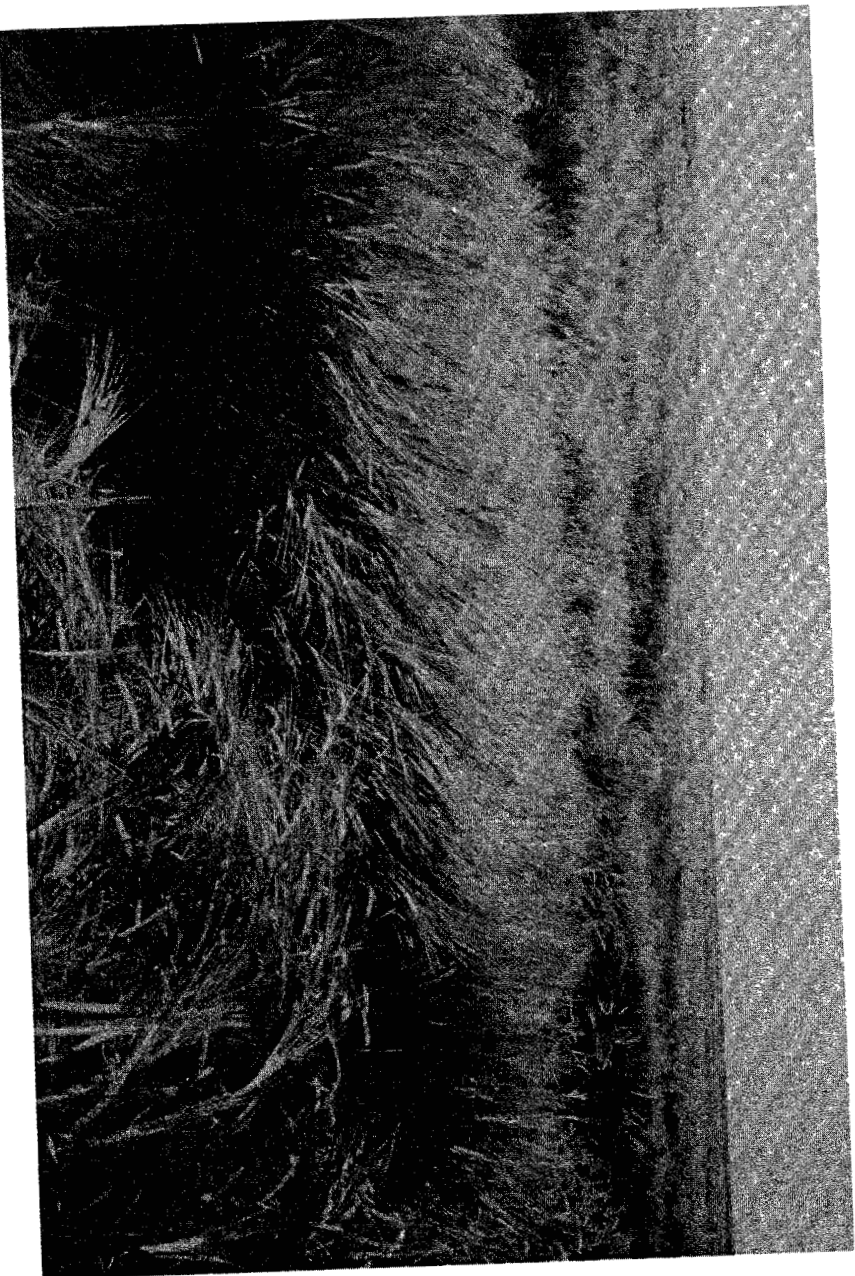
Septage that does not meet the Federal definition of domestic septage, must be managed and disposed in accordance with:

- (1) EPA's 40 CFR Part 503 if the non-domestic septage (commercial septage, industrial septage, grease trap pumpings, or mixtures of domestic and non-domestic septage) is discharged for treatment into a treatment works that also receives domestic sewage.



OTHER USE AND DISPOSAL OF DOMESTIC AND NON-DOMESTIC SEPTAGE

- (2) EPA's 40 CFR Part 257 if non-domestic septage is directly used or disposed in all but a municipal solid waste [MSW] landfill.
- (3) EPA's 40 CFR Part 258 if non-domestic septage is disposed in a MSW landfill.
- (4) EPA's 40 CFR Part 261 if the septage is classified as a hazardous waste.
- (5) Other applicable Federal, State, and local rules.



SECTION 3

FEDERAL STANDARDS FOR THE APPLICATION OF DOMESTIC SEPTAGE

INTRODUCTION

The following Federal requirements have been established to ensure safe land application practices. These requirements pertain only to persons who apply domestic septage to non-public contact sites (agricultural land, forests, and reclamation sites.) The requirements include:

- 1) Provisions for control of disease-causing organisms called pathogens and the reduction of the attractiveness of the domestic septage to vectors like flies, rodents, and other potential disease carrying organisms. Note that the processes that reduce the attractiveness to vectors also reduce the potential for objectionable odors being generated and released.

EXAMPLES OF VECTORS



**FEDERAL STANDARDS FOR THE APPLICATION OF DOMESTIC SEPTAGE**

- 2) Limits on application rates and restrictions on crop harvesting, animal grazing, and site access. Limited application rates minimize the addition of pollutants and the potential for over application of the fertilizer and element nitrogen, hence protecting ground and surface water from contamination with excess nitrogen. Restrictions on crop harvesting, animal grazing, and site access protect from contact with pathogens while still potentially viable.
- 3) The information you must collect, records that you must keep, and the certification you must make to assure that the pathogen and vector attraction reduction requirements have been met.
- 4) Provisions for you to notify the owner or lease holder of the land onto which the domestic septage is applied about the crop and site restrictions that the land owner must obey.

While not required by the rule, it is important that the septic tank pumper inform the owner or lease holder of how much of the crop's nitrogen requirement was added by the applied domestic septage.

By knowing how much of the crop's nitrogen requirement was fulfilled through use of the domestic septage, the land owner can determine how much additional nitrogen in the form of chemical fertilizer, if any, will need to be applied.

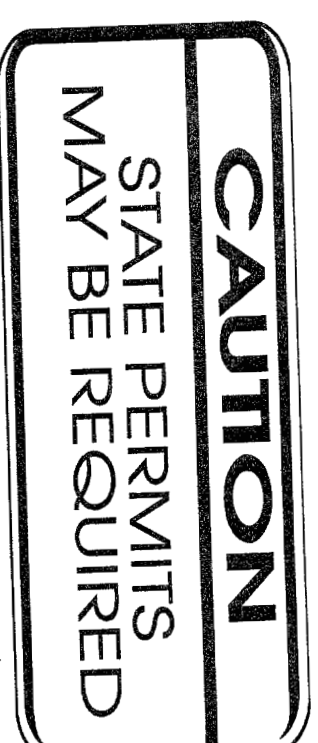
Where the pH adjustment is utilized, Federal requirements apply on a truckload by truckload basis unless pH adjustment was done in a separate treatment device (e.g., lagoon or tank). Domestic septage application rate requirements apply to each field site, adjusted to the nitrogen requirement for the crop being grown.

**FEDERAL STANDARDS FOR THE APPLICATION OF DOMESTIC SEPTAGE**

**PERMITS AND COMPLIANCE**

In general, Federal permits are not required for persons who apply domestic septage to non-public contact sites.

Even though Federal permits may not be required, governmental authorities have the right to inspect your



land application operations along with all other Federally required records at any time. You can be fined and other penalties can be imposed if you are not in compliance (correctly following the requirements) with all applicable Part 503 requirements.





If the domestic septage is treated in a central facility, the treatment facility may need to apply for a permit. If you operate such a treatment facility, you should ask about the possible need for a permit at the applicable State or EPA Regional office listed in Appendix A.

WHEN MUST I  
COMPLY WITH  
THE PART 503  
REGULATION?

The Part 503 Federal rule requires that you begin to monitor and keep records by July 20, 1993.

You have until February 19, 1994, before you have to meet all the other requirements of the rule along with the certification that you are meeting the pathogen and vector attraction reduction requirements of the rule.

NOTE

The Part 503 Regulation allows an extra year until February 19, 1995, to be in compliance if construction of new pollution control facilities is required. Applicers of domestic septage to non-public contact sites will not have this extra year because EPA does not believe that new pollution control facilities are needed to be in compliance with this less burdensome Federal rule.]

RECORD  
KEEPING AND  
REPORTING  
FOR LAND  
APPLIERS

You must keep records for five years after any application of domestic septage to a site, but you are not required to report this information. As previously stated, these required records may be requested for review at any time by the permitting or enforcement authority. The retained records must include the information shown in Figure 1 and a written certification (see Figure 7). Appendix C contains samples of ways to organize your record keeping. You are not required to use such sheets, but they may be helpful.

Figure 1:  
RECORD KEEPING REQUIREMENTS

- 1] The location of the site where domestic septage is applied, either the street address, or the longitude and latitude of the site (available from the U.S. Geological Survey maps).
- 2] The number of acres to which domestic septage is applied at each site.
- 3] The date and time of each domestic septage application.
- 4] The nitrogen requirement for the crop or vegetation grown on each site during the year. Also, while not required, indicating the expected crop yield would help establish the nitrogen requirement.
- 5] The gallons of septage which are applied to the site during the specified 365-day period.
- 6] The certification shown in Figure 7.
- 7] A description of how the pathogen requirements are met for each batch of domestic septage that is land applied.
- 8] A description of how the vector attraction reduction requirement is met for each batch of domestic septage that is land applied.

FEDERAL STANDARDS FOR THE APPLICATION OF DOMESTIC SEPTAGE

DETERMINING  
THE ALLOWED  
ANNUAL RATE  
FOR APPLYING  
DOMESTIC  
SEPTAGE TO  
NON-PUBLIC  
CONTACT  
SITES

The maximum volume of domestic septage that may be applied to any site during a 365-day period depends on the amount of nitrogen required by the planned crop and the yield. This maximum volume is calculated by the following formula, where Annual Application Rate is represented by AAR:

$$AAR \text{ (gallons/acre/year)} = \frac{\text{Pounds Nitrogen Required for Crop Yield}}{0.0026}$$

As an example, if 100 pounds of nitrogen per acre is required to grow a 100 bushel per acre crop of corn, then the annual application rate of domestic septage is 38,500 gallons per acre.

$$AAR = \frac{100}{0.0026} = 38,500 \text{ gallons/acre/year}$$

The primary reason for this annual rate calculation is to prevent the over application of nitrogen in excess of crop needs and its potential movement through soil to groundwater. The annual application rate formula was derived using assumptions to make land application very workable for domestic septage haulers. For example, fractional availability of nitrogen from land-applied domestic septage was assumed over a 3-year period to obtain the "0.0026" factor in the annual application rate formula. Also, in deriving the formula, domestic septage was assumed to contain about 350 mg/kg total nitrogen and 2.5% solids (about 1.4% total nitrogen on a dry weight basis).

FEDERAL STANDARDS FOR THE APPLICATION OF DOMESTIC SEPTAGE

For additional guidance on avoiding nitrogen contamination of groundwater when land applying domestic septage with a high nitrogen content or dewatered domestic septage, see the examples below.

AVOIDING NITROGEN CONTAMINATION OF GROUNDWATER  
WHEN LAND APPLYING DOMESTIC SEPTAGE

CASE  
EXAMPLE 1:  
DOMESTIC  
SEPTAGE WITH  
HIGH  
NITROGEN  
CONTENT  
OPTIONS

Portable chemical toilet and type III marine sanitation device domestic septage wastes can contain 4 to 6 times more total nitrogen than was assumed to derive the annual application rate formula.

While not required by the Part 503 Regulation, good practice argues that you consider reducing the volume applied per acre of such high nitrogen-containing domestic septage. For example, if the land owner is expecting to grow a 100-bushel per acre corn crop, and the domestic septage contains 6 times more total nitrogen, the gallons applied should be reduced 6-fold (from 38,500 to about 6,400 gallons).

CASE  
EXAMPLE 2:  
DEWATERED  
DOMESTIC  
SEPTAGE  
OPTIONS

Some domestic septage servicing companies dewater or otherwise cause solids to settle out before land application. This is often done by treating the domestic septage with lime and temporarily storing it in a tank or lagoon during periods when the climate or soil conditions are not favorable for land application.

A firm that has dewatered septage in this manner, prior to land application, has several options to consider:

REMIX LIQUIDS  
AND SOLIDS —  
MANAGE  
MIXTURE AS  
DOMESTIC  
SEPTAGE

A) Remix the solids with the overlying liquid and apply the mixture according to the annual application rate formula.

*[This option is simple and easy to implement.]*

*[A major drawback of this option is that much of the nitrogen is lost during lime treatment in an open tank or lagoon and the amount of available nitrogen in the domestic septage applied to the farmer's field will likely supply less nitrogen than is assumed using the annual application rate formula.]*

MANAGE  
SEPARATED  
SOLIDS AS  
SEWAGE  
SLUDGE

B) Separate the liquid from the solids and manage the separated solids as sewage sludge, following the Part 503 Regulation for sewage sludge. The liquid effluent could either go into a sanitary sewer, be irrigated onto land, or be discharged to surface water, after obtaining the appropriate approvals and permits.

*[A major advantage of this option for the farmer is that the application of the dewatered domestic septage is based upon its analysis for nitrogen, and can therefore supply the agronomic rate (crop requirement) of nitrogen. With this assurance, the farmer does not have to guess how much nitrogen was supplied by the septage and would not be tempted to apply chemical nitrogen to make sure that enough nitrogen had been supplied for his crop.]*

*[A major disadvantage of this option for the septage service company is the extra cost associated with additional requirements for nitrogen and metal*

*testing, pathogen and vector attraction reduction, management practices, record keeping, etc.]*

Scott Harris of the Interstate Septic Systems in Maine says that their firm dewaterers and manages the solids separated from domestic septage as sewage sludge. Their analytical costs run about \$200.00 per sample for a complete metal and nutrient analysis. They feel that the extra cost seems to be reasonable for the yearly 2 million gallons of domestic septage which they process.

MANAGE  
SEPARATED  
SOLIDS AS  
DOMESTIC  
SEPTAGE

C) Separate the liquid from the solids and manage the separated solids as domestic septage. If the separated solids are managed as domestic septage, they can be land applied at an annual application rate based upon the gallons of septage from which they were separated during treatment.

For example, suppose that each 10,000 gallons of domestic septage resulted in 500 pounds of residue after dewatering (consisting of septage solids, tightly held water and added lime). For a 100 bushel per acre corn crop, the annual application rate formula indicates that 38,500 gallons of undewatered domestic septage per acre is the maximum amount that can be applied. The pounds of dewatered septage that can be applied annually can be determined as follows:

Pounds of dewatered septage that can be applied	=	Gallons of un-dewatered septage for crop nitrogen requirement	X	Pounds of cake solids from 10,000 gallons of septage
	=	38,500	X	500
		10,000		= 1925 pounds

In this example, a maximum of 1925 pounds of dewatered domestic septage could be applied each year to an acre of land for a 100 bushel per acre corn crop.

The effluent could either go into a sanitary sewer, be irrigated onto a separate area of land, or be discharged to surface water after obtaining appropriate approval and permits as required. Theoretically, one could apply the separated liquid effluent back to the same land to which the separated solids were applied - in this example the 38,500 gallons (less solids) of domestic septage effluent could be applied to the same acre that the 1925 pounds of solids had been applied.

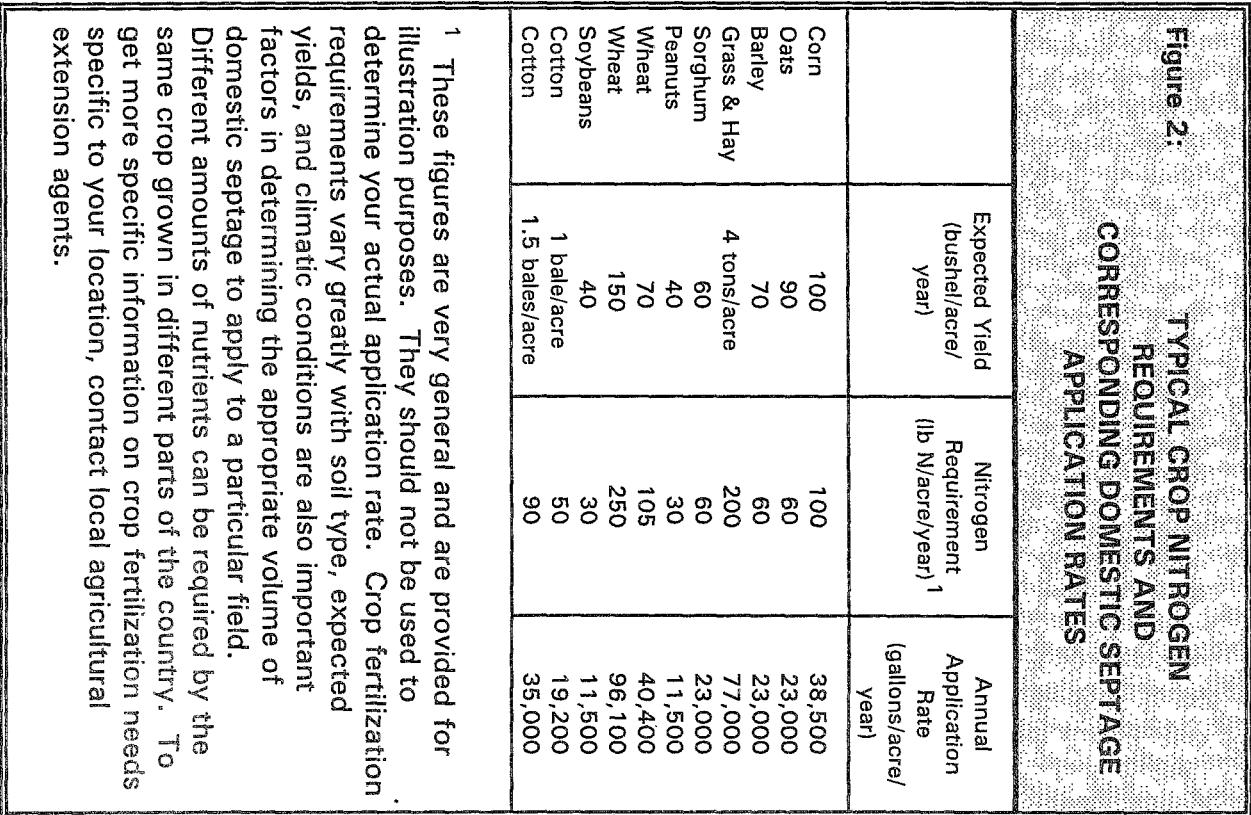
*[A major drawback to this option is that only a relatively small quantity of dewatered solids could be applied per acre. These solids would likely not supply the needed crop nitrogen requirement due to losses of nitrogen during lime treatment and dewatering.]*

*[As a result, nitrogen management on the application site would be difficult. Not knowing the actual nitrogen supplied by the dewatered domestic septage, the farmer might add the full amount of nitrogen required by the crop using chemical fertilizers. As a result, over time the groundwater might become contaminated with excess nitrogen.]*

**CAUTION**

You may not apply a greater volume of domestic septage to land than is calculated by the annual application rate formula (e.g., in Options A and C), even if the applied remixed liquid domestic septage or its separated solids contain less than the required amount of nitrogen for the crop being grown. This is because the EPA Part 503 domestic septage application rate formula limits more than the amount of nitrogen added to the land (e.g., pollutants like heavy metals are also indirectly limited by the formula). The exception to this caution is if domestic septage is treated as sewage sludge in Option C.

Example domestic septage application rates are given in Figure 2 (corresponding to nitrogen requirements for various crops and expected yields). These are only guidance; more exact information on the amount of nitrogen required for the expected crop yield under local soil and climatic conditions should be obtained from a qualified, knowledgeable person, such as your local agricultural extension agent. This crop nitrogen requirement is then used in the annual application rate formula to calculate the gallons per acre of domestic septage that can be applied.



**PATHOGEN REDUCTION REQUIREMENTS CROP AND SITE RESTRICTIONS**

Domestic septage must be managed so that pathogens (disease-causing organisms) are appropriately reduced. The Part 503 Regulation offers two alternatives from which you can pick to meet this requirement. The first alternative (no treatment) and its restrictions are presented in Figure 3; the requirements of the second option (pH of 12 for a minimum of 30 minutes) are listed in Figure 4.

Please note that both of the pathogen reduction alternatives impose crop harvesting restrictions. However, site access controls are required unless the pH pathogen treatment alternative is used. Remember that you are required to inform the owner/operator of the land where the domestic septage has been applied about these crop harvesting and site access restriction requirements. This notification is required because you, the applicer of the domestic septage, must certify that these conditions are met.





# FEDERAL STANDARDS FOR THE APPLICATION OF DOMESTIC SEPTAGE

<p><b>Figure 3:</b></p> <p><b>PATHOGEN REDUCTION ALTERNATIVE 1<sup>1</sup></b> for Domestic Septage (Without Additional Treatment) Applied to Non-Public Contact Sites</p> <p>Domestic septage is pumped from the septic tank or holding tank and land applied without treatment, and</p> <p><u>Crop Restrictions:</u></p> <ul style="list-style-type: none"> <li>i) Food crops with harvested parts that touch the septage/soil mixture and are totally above ground shall not be harvested for 14 months after application of domestic septage.</li> <li>ii) Food crops with harvested parts below the surface of the land shall not be harvested for 38 months after application of domestic septage.</li> <li>iii) Animal feed, fiber, and those food crops that do not touch the soil surface shall not be harvested for 30 days after application of the domestic septage.</li> <li>iv) Turf grown on land where domestic septage is applied shall not be harvested for one year after application of the domestic septage when the harvested turf is placed on either a lawn or land with a high potential for public exposure, unless otherwise specified by the permitting authority.</li> </ul> <p><u>Grazing Restrictions:</u></p> <ul style="list-style-type: none"> <li>i) Animals shall not be allowed to graze on the land for 30 days after application of domestic septage.</li> </ul> <p><u>Site Restrictions:</u></p> <ul style="list-style-type: none"> <li>i) Public access to land with a low potential for public exposure shall be restricted for 30 days after application of domestic septage. Examples of restricted access include remoteness of site, posting with no trespassing signs, and/or simple fencing.</li> </ul>	<p><sup>1</sup> You must meet either of the two pathogen reduction alternatives discussed in Figure 3 or 4 (not both).</p>
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# FEDERAL STANDARDS FOR THE APPLICATION OF DOMESTIC SEPTAGE

<p><b>Figure 4:</b></p> <p><b>PATHOGEN REDUCTION ALTERNATIVE 2<sup>1</sup></b> for Domestic Septage (With pH Treatment) Applied to Non-Public Contact Sites</p> <p>The domestic septage pumped from the septic tank or holding tank has had its pH raised to 12 or higher by the addition of material such as hydrated lime or quicklime and, without adding more alkaline material, the domestic septage remains at a pH of 12 or higher for at least 30 minutes prior to being land applied, and</p> <p><u>Crop Restrictions:</u></p> <ul style="list-style-type: none"> <li>i) Food crops with harvested parts that touch the septage/soil mixture and are totally above ground shall not be harvested for 14 months after application of domestic septage.</li> <li>ii) Food crops with harvested parts below the surface of the land shall not be harvested for 20 months after application of domestic septage when the domestic septage remains on the land surface for four months or longer prior to incorporation into the soil.</li> <li>iii) Food crops with harvested parts below the surface of the land shall not be harvested for 38 months after application of domestic septage when the domestic septage remains on the land surface for less than four months prior to incorporation into the soil.</li> <li>iv) Animal feed, fiber, and those food crops whose harvested parts do not touch the soil surface shall not be harvested for 30 days after application of the domestic septage.</li> <li>v) Turf grown on land where domestic septage is applied shall not be harvested for one year after application of the domestic septage when the harvested turf is placed on either a lawn or land with a high potential for public exposure, unless otherwise specified by the permitting authority.</li> </ul> <p><u>Grazing Restrictions:</u></p> <ul style="list-style-type: none"> <li>None</li> </ul> <p><u>Site Restrictions:</u></p> <ul style="list-style-type: none"> <li>None</li> </ul>	<p><sup>1</sup> You must meet either of the two pathogen reduction alternatives in Figure 3 or 4 (not both). Note, if you meet this pH 12 pathogen reduction alternative, you also meet vector attraction reduction alternative number 3 listed in Figure 5.</p>
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VECTOR  
ATTRACTION  
REDUCTION  
ALTERNATIVES

If you choose pathogen reduction alternative 1 (see Figure 3), land application of the domestic septage without additional treatment, you also will be required to meet one of two vector attraction reduction alternatives. One of these alternatives is subsurface injection of the septage, the other is incorporation into the surface of the soil within 6 hours. The requirements of these two vector attraction reduction alternatives are discussed in Figure 5.

On the other hand, if you choose pathogen reduction alternative 2 (pH treatment as described in Figure 4) you also meet the requirements of vector attraction reduction alternative 3, also shown in Figure 5.

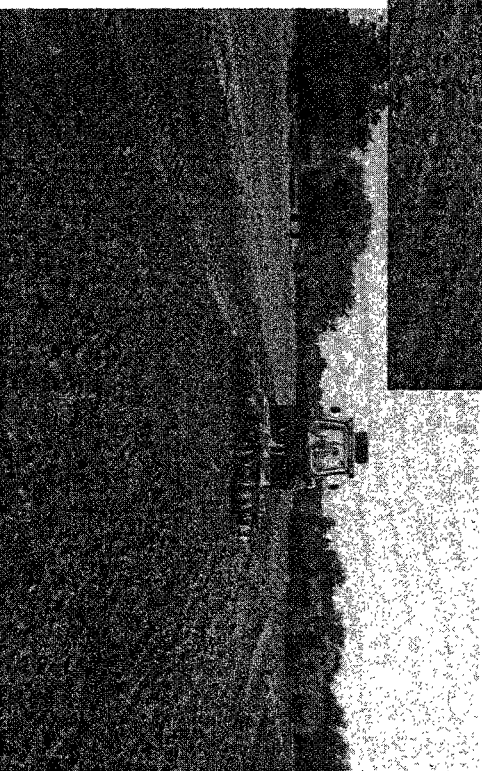
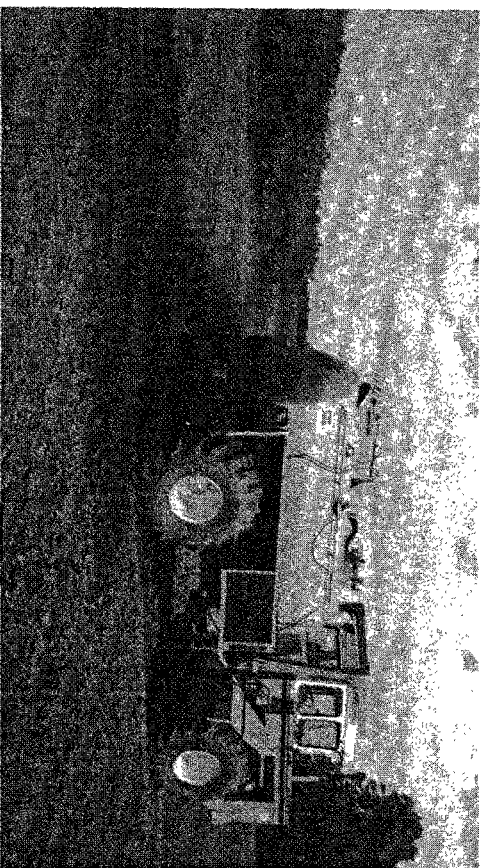


Figure 5: VECTOR ATTRACTION REDUCTION ALTERNATIVES<sup>1</sup> for Domestic Septage applied to Non-Public Contact Land

VECTOR ATTRACTION REDUCTION ALTERNATIVE 1: Injection
Domestic septage shall be injected below the surface of the land, <u>AND</u> no significant amount of the domestic septage shall be present on the land surface within one hour after the domestic septage is injected;
OR
VECTOR ATTRACTION REDUCTION ALTERNATIVE 2: Incorporation
Domestic septage applied to the land surface shall be incorporated into the soil surface plow layer within six (6) hours after application;
OR
VECTOR ATTRACTION REDUCTION ALTERNATIVE 3: pH Adjustment
The pH of domestic septage shall be raised to 12 or higher by addition of alkaline material and, without the addition of more alkaline material, shall remain at 12 or higher for 30 minutes.
<sup>1</sup> You must meet vector attraction reduction alternatives 1, 2 or 3 - only one.

CASE  
EXAMPLES

The following are case examples of septage management options:

CASE EXAMPLE — Management of Untreated Domestic Septage	
1)	The untreated domestic septage is pumped directly into the truck's tank and hauled to a non-public contact site.
2a)	The domestic septage is injected below the land surface with no significant amount of domestic septage remaining on the land surface within one hour after the domestic septage is injected (vector attraction reduction alternative 1).
OR	
2b)	The domestic septage is incorporated into the soil surface within six hours after application to the land (vector attraction reduction alternative 2).
3a)	If an animal feed crop like hay, a food crop like corn (which does usually not touch the surface of the soil), or a fiber crop like cotton is grown, a minimum wait of 30 days after application of the domestic septage is required before the crop may be harvested.
OR	
3b)	A minimum wait of 30 days after application of the domestic septage is required before letting animals graze the pasture.
OR	
3c)	If a food crop, like melons or cucumbers that touch the surface of the soil, is grown, a wait of 14 months after application of the domestic septage is required before that food crop.
OR	
3d)	If you raise a food crop, like potatoes or onions which grow below the surface of the soil, a minimum wait of 38 months after application of the domestic septage is required before that food crop may be harvested. Additional examples of the different kinds of crops described in 3a to 3c are listed in Figure 6.
4)	Public access to this non-public contact site (site with a low potential for public exposure) must be restricted for 30 days after application of untreated domestic septage. Examples of restricted access includes remoteness of site, posting with "no trespassing" signs, and simple fencing.
5)	You must complete and sign the certification listed in Figure 7 about meeting the pathogen and vector attraction reduction requirements.

Figure 6: EXAMPLES OF CROPS IMPACTED BY DOMESTIC SEPTAGE PATHOGEN REQUIREMENTS			
With Harvested Parts Which...			
Usually Do Not Touch the Ground	Usually Touch the Ground	Are Below the Ground	
Peaches Apples Corn Wheat Oats Barley Oranges Grapefruit Cotton Soybeans	Melons Eggplant Squash Tomatoes Cucumbers Celery Strawberries Cabbage Lettuce Hay	Potatoes Yams Sweet Potatoes Rutabaga Peanuts Onions Leeks Radishes Turnips Beets	

FEDERAL STANDARDS FOR THE APPLICATION OF DOMESTIC SEPTAGE

CASE EXAMPLE: Management by pH Adjustment	
1)	The pH of domestic septage is raised to 12 by treatment with an alkaline material such as hydrated or quicklime. Each batch of domestic septage that is applied to land must have its pH at 12 for a minimum of 30 minutes. By this treatment you have met the pH part of the pathogen reduction alternative 2 and vector attraction reduction alternative 3.
2a)	If animal feed, a food crop like corn (that does not usually touch the surface of the soil), or a fiber crop like cotton is grown, a minimum wait of 30 days after application of the domestic septage is required before the corn may be harvested.
OR	
2b)	If a feed crop, like hay is grown, a minimum of 30 days after application of the domestic septage is required before the hay may be harvested. However, animals can be grazed immediately after application of the pH-treated domestic septage to the pasture.
OR	
2c)	If a food crop, like melons or cucumbers that touch the surface of the soil is grown, a wait of 14 months after application of the domestic septage is required before that food crop may be harvested.
OR	
2d)	If a food crop, like potatoes or onions which grow below the surface of the soil, is produced, a minimum wait of 20 or 38 months after application of the domestic septage is required before that food crop may be harvested -- the shorter period of time is permitted only if the lime-treated domestic septage remained on the surface of the soil for greater than four months before being incorporated.
3)	There are no animal grazing or public access restrictions in Case 2 where the pH of the domestic septage was raised to 12 for a minimum of 30 minutes.
4)	You must complete and sign the certification listed in Figure 7 about meeting pathogen and vector attraction reduction requirements.

HOW TO  
RAISE THE pH  
OF DOMESTIC  
SEPTAGE

The alkaline materials most commonly used by septage haulers to raise the pH of domestic septage are hydrated lime and quicklime. There are several methods by which hydrated lime or quicklime can be added to the septage for treatment in the pumper truck tank. Methods that septage servicing professionals have recommended are presented below, along with cautions they have passed on. Any one of these methods may work well for you. However, whatever method you choose, you must test two separate, representative samples of the batch of lime-treated domestic septage taken a minimum of 30 minutes apart to verify that the pH remains at 12 or greater for that minimum 30-minute time period. Each method involves adding 20 to 40 pounds of lime per 1000 gallons of domestic septage.

THE pH OF THE DOMESTIC SEPTAGE MUST REMAIN AT 12 OR HIGHER FOR AT LEAST 30 MINUTES AFTER THE ALKALINE MATERIAL IS ADDED.

Using Hydrated Lime

One approach was described by David Pickar, whose septage servicing business is in Oregon. His procedure involves slurring hydrated lime in water and subsequently bleeding the lime slurry into the vacuum draw line at the same time domestic septage is being pumped into the truck.

He places hydrated lime (calcium hydroxide) in a plastic tank partly filled with water (e.g., 55-gallon open plastic drum or a 100-gallon plastic tank). He adds about 13



FEDERAL STANDARDS FOR THE APPLICATION OF DOMESTIC SEPTAGE

gallons of water to 50 pounds of lime and mixes it with an electric paddle mixer to form a slurry. The slurried lime mixture is drawn off through a stop-cock valve at the base of the mixing tank into 5-gallon buckets (for example, plastic paint buckets). Each bucket contains a water-lime slurry with between 20 to 30 pounds of lime (dry weight basis) in the mix. The consistency of this mixture would be somewhat thinner than drywall spackling compound (mud). The 5-gallon buckets are hauled on the septage pumper truck.



Reference: Register of American Manufacturers  
JWI, Inc.

FEDERAL STANDARDS FOR THE APPLICATION OF DOMESTIC SEPTAGE

A "T" fixture has previously been fitted into the pumper truck's septage draw line. This "T" fitting attaches in a small-diameter, valved polyethylene line (one-half inch in diameter). The line is used at the proper time to bleed slurried lime into the truck as the septage is being drawn in.

David draws a portion of the septage from a septic tank into the truck without bleeding in the lime slurry. He then blows back the partially pumped load of septage into the septic tank to break up any layers of hardened septage solids and grease.

Now, at the same time the septage is pumped back into the truck for hauling and land application, he bleeds the slurry into the truck from a 5-gallon bucket at the rate of one bucket per each 1000 gallons of septage pumped.

The pH of the pumped, lime-treated septage will have to be tested by the pumper to see that enough lime has been added to cause it to remain at a minimum of 12 for 30 minutes. Suggested procedures for sampling and testing the pH are described in the next subsection of this guidance.

Using Quicklime

Tom Ferrero, whose septage servicing business is in Pennsylvania, uses quicklime (calcium oxide) instead of hydrated lime for raising the pH. He reports using a more dilute mixture of water and lime in his slurry than David Pickar (about 80 pounds of lime to 50 gallons of water).



**CAUTION:** Quicklime is more reactive than hydrated lime and it releases a lot of heat. **IF QUICKLIME IS USED, SAFETY PRECAUTIONS MUST BE TAKEN.** Quicklime can cause bad burns if it gets onto moist skin or into your eyes. Appropriate safety precautions include the use of rubberized gloves, a respirator to exclude dust, and protective eyewear and clothing to keep moist skin from contacting the quicklime. In addition, a fire could start if a bag of quicklime gets wet and sits around. Any fire involving quicklime must be put out using a carbon dioxide [CO<sub>2</sub>] extinguisher, not water. Water sprayed onto such a fire would only react with the quicklime and release more heat. (See Appendix D for additional cautions.)

When Tom intends to land apply the septage within an hour or so after pumping, he draws the slurried lime into his truck at the rate of about 20 pounds per 1000 gallons of septage pumped. He has tried drawing the lime slurry into his trucks both before and after pumping the septage, but prefers to draw the slurry in before pumping.

When Tom intends to hold the septage for some period of time before he land applies, he places it in a large tank at his business location. He draws lime slurry into the tank and uses an electric mixer to uniformly raise the pH.

**Note:** Pumpers have indicated their reluctance to raise the pH in the septic tank either indirectly (as just described) or directly by placing lime in the septic tank before pumping. This is caused by unfounded concern that the raised pH within the septic tank could possibly disrupt the biological treatment that occurs there. The fact is that only very minimal temporary disruptions of the biological treatment occur.



Tom reports that the exact amount of lime solids required per 1000 gallons of septage (generally between 20 and 30 pounds) depends upon the solids content of the septage: thicker septage requires more lime to reach the required pH of 12.

### Using Dry Alkaline Material

Hydrated lime or quicklime can also be added in a dry form directly into the pumper truck at the same rate of approximately 20 to 30 pounds per 1000 gallons of domestic septage about to be pumped. The dry lime can be added from the top of the truck via ports or by sucking dry lime into the truck using the vacuum line. However, when sucking the dry lime in through the vacuum line, some of the lime may make its way through to the pump and could ultimately cause undue wear. In addition, the lime may clump in the bottom of the truck and not mix well. Finally, if dry quicklime powder were used, it could react with any moisture in your plastic draw line and release enough heat to damage the line.

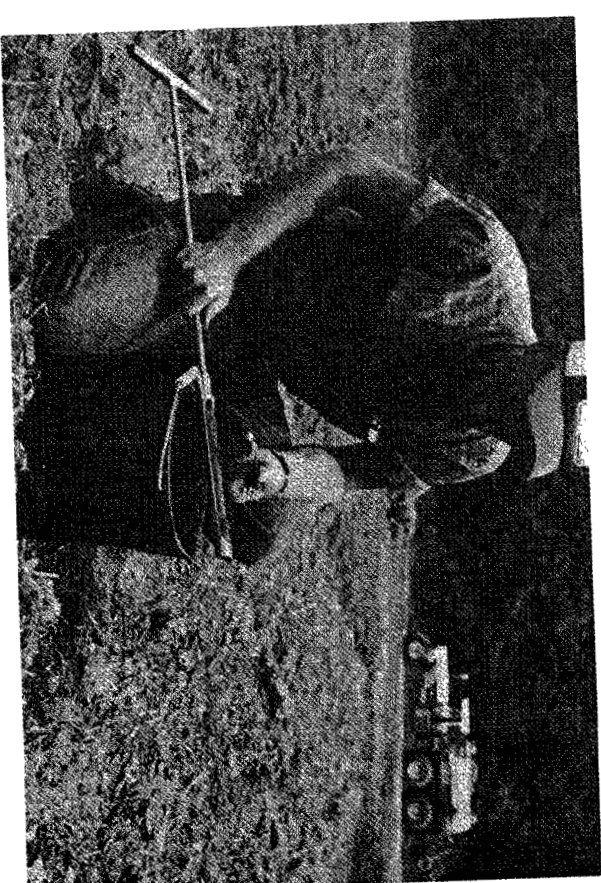
### Other Alkaline Material

Other alkaline materials may be available for raising the pH of the domestic septage. These materials are often manufacturing byproducts. Some of these byproducts contain significant levels of pollutants such as heavy metals. You should test these materials to determine that you are not adding pollutants in excess of the pollutant concentration levels shown in Appendix B.

### General

Any of these pH adjustment alternatives may work for you. The key is that enough lime or other suitable alkaline material be thoroughly mixed with the septage so that the pH remains at 12 for a minimum of 30 minutes before being applied to non-public contact sites.

### SAMPLING AND TESTING TO DETERMINE THE pH OF DOMESTIC SEPTAGE



You should not automatically assume that the lime or other alkaline material you have added and the method of mixing chosen will adequately increase the pH of the domestic septage. The pH must be tested. A representative sample should be taken from the body of the truckload or tank of domestic septage for testing. For example, a sampling container could be attached to a rod or board and dipped into the septage through the hatch on top of the truck or tank or through a sampling port. Alternatively, a sample could be taken from the rear discharge valve at the bottom of the truck's tank. However, if the lime has settled to the bottom of the tank and has not been properly mixed with the septage, the sample will not be representative. Two separate samples should be taken 30 minutes apart, and both of the samples must test at pH 12 or greater. If the pH is not at 12 or greater for a full 30 minutes, additional lime can be added and mixed with the septage. However, after mixing in the additional lime, the septage must be at 12 or greater for a full 30 minutes in order to meet the pH requirement of the Part 503 Regulation.

The pH of the domestic septage sample can be tested using either a pH meter or pH-sensitive colored paper. There are several brands of suitable pH-sensitive paper. See Appendix D for additional information about these materials.

CERTIFICATION

The land applier of domestic septage must sign the certification that the pathogen and vector attraction reduction requirements of the Part 503 Regulation have been met and retain this certification in his files for 5 years. The required certification is given in Figure 7. Note that a land applier with employees must assure that his/her employees are qualified. These employees must be capable of gathering the needed information and performing the necessary tasks so that the required pathogen and vector attraction reduction requirements are met.



Figure 7: CERTIFICATION

"I certify under penalty of law, that the pathogen requirements in *[insert either alternative 1 or 2]* and the vector attraction reduction requirements in *[insert either vector reduction alternative 1, 2 or 3]* have/have not *[circle one]* been met. This determination has been made under my direction and supervision in accordance with the system designed to assure that qualified personnel properly gather and evaluate the information used to determine that the pathogen requirements and the vector attraction reduction requirements have been met. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment."

*Im Anna Plier*

Signed: "Im Anna Plier"

(to be signed by the person designated as responsible in the firm that applies domestic septage

A person is qualified if he or she has been sufficiently trained to do their job correctly. The critical test of this qualification is passing an inspection of field performance and records by authorized State or Federal inspectors.

SECTION 4

FEDERAL STANDARDS FOR THE APPLICATION OF DOMESTIC SEPTAGE

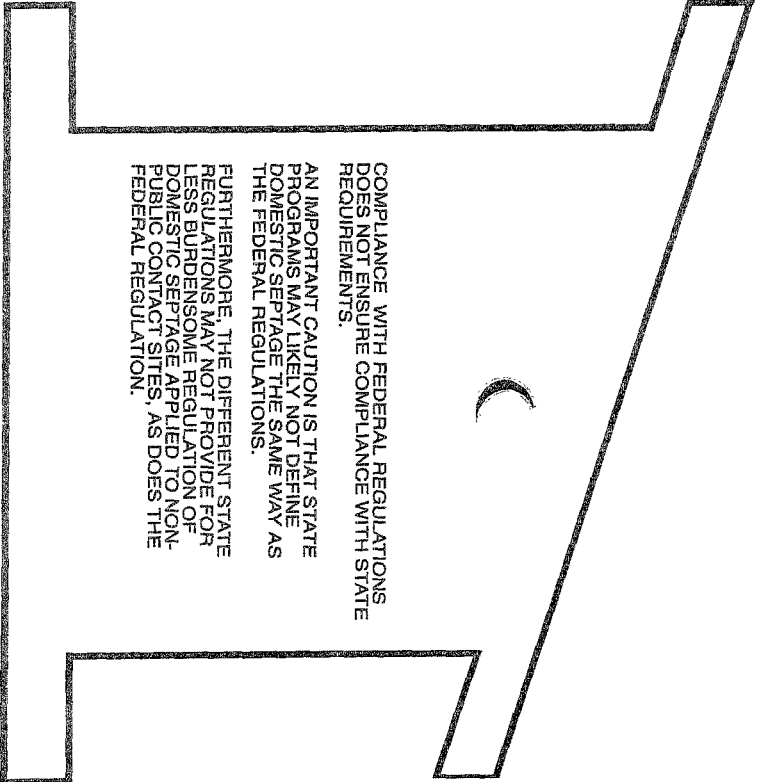
MANAGEMENT PRACTICES

There are no specific Federal management practice requirements for appliers of domestic septage to non-public contact sites in the Part 503 Regulation. On the other hand, many states have specific management practice requirements that you must follow. Such required practices may include minimum distances between sites where domestic septage has been applied and drinking water wells and surface water streams. Good practice would also suggest a caution against applying domestic septage to flooded, frozen, or snow-covered land such that it will run-off into a wetland or surface water stream. Even if the domestic septage did not reach surface water, it should not be allowed to concentrate and overload a portion of the field with nutrients or be allowed to collect in low areas and road ditches and create a nuisance condition.

SECTION 4

STATE RULES ALSO APPLY FOR LAND APPLICATION OF DOMESTIC SEPTAGE

Although the Federal Part 503 Standards for the Use or Disposal of Sewage Sludge, including domestic septage, were signed in 1992 and published on February 19, 1993, many states have had septage management programs for years. The Federal regulation only sets a minimum national standard which must be met by all domestic septage appliers.



In some cases the State requirements may be more restrictive or may be administered in a different manner than the Federal regulation. State programs may likely not define domestic septage in the same manner as the Federal regulation. Furthermore, the different state



regulations may not provide less burdensome regulatory requirements when domestic septage is applied to non-public contact sites, as does the Federal regulation. In any case, applicers of domestic septage to non-public contact sites must meet all requirements of both State and Federal septage regulations until a State obtains approval from EPA for administering the Federal sewage sludge regulatory program. States can change their regulations to meet the minimum Federal standards and obtain a Federally approved program at any time, but they are under no obligation to do so.

**DECIDING  
HOW TO  
MEET BOTH  
FEDERAL AND  
STATE RULES**

- Knowing exactly which rules to follow can be somewhat complicated. The following situations should help you to determine what you are required to do:
- In all cases, applicers of domestic septage to non-public contact sites have to follow the new Part 503 Regulation for domestic septage management, as explained in this document.
- If your State has its own rules governing the use or disposal of domestic septage and has not yet adopted the Federal rule, you will have to first assure that you are complying with the Federal rule and then do whatever else is required by the State.

If your State has gained approval from EPA to administer the Federal rule, then you will only have to follow your State's rule to meet the requirements of both rules. This is because your State, as a condition of gaining EPA's approval, has incorporated the Federal requirements into its rule.

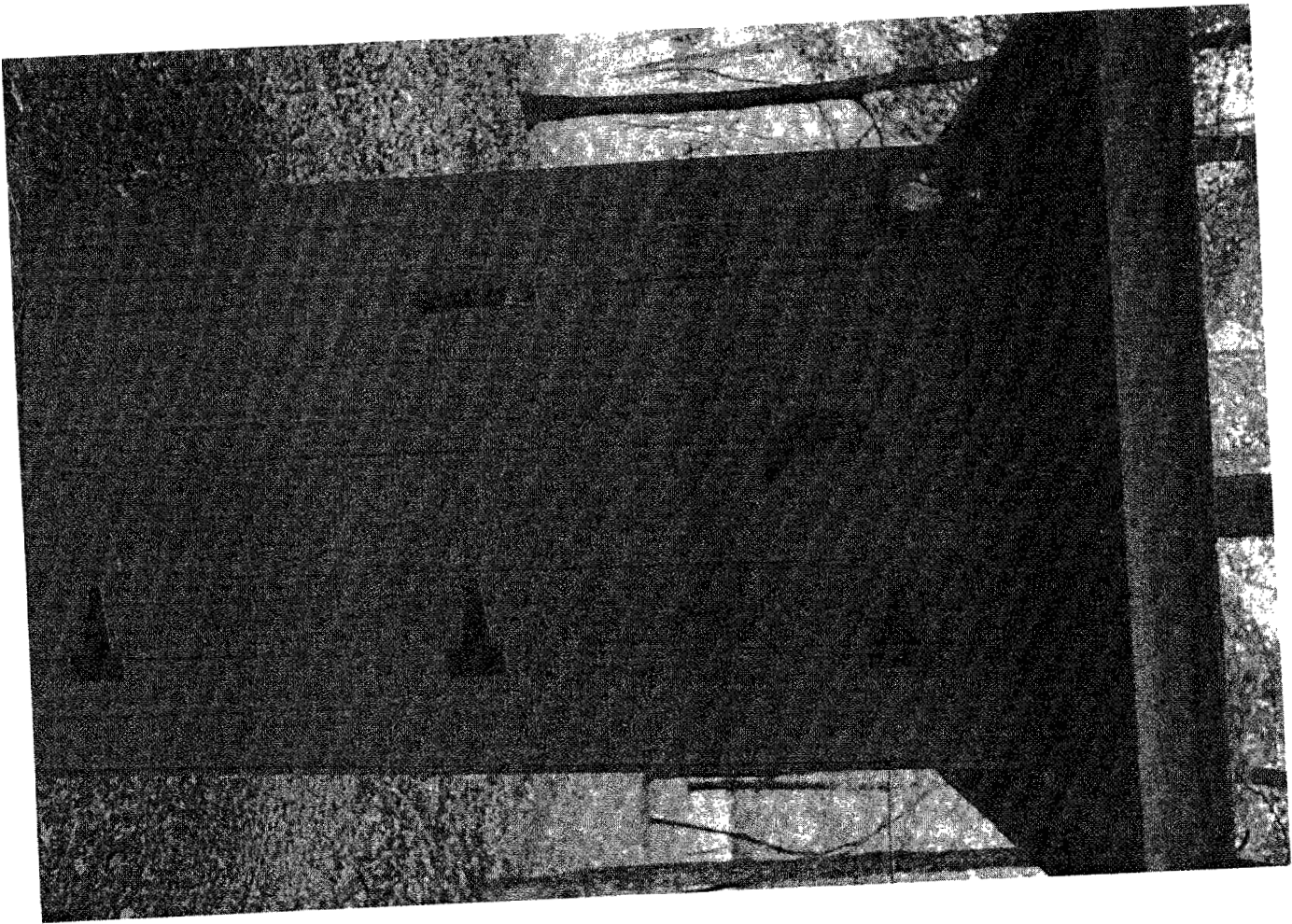
Each State has a different approach to regulating the land application of domestic septage. The current

septage management programs of Florida and Minnesota are described in Appendix E. The septage program requirements of these two States are presented as an example of how State and Federal rules may differ. Differences between these two States and the Federal regulatory requirements are summarized in Figure 8. Regulatory requirements of several other states are discussed in the USEPA Region 5 publication (5).

**YOU ARE STRONGLY ENCOURAGED TO  
CHECK WITH THE APPROPRIATE STATE  
SEPTAGE COORDINATOR (PROVIDED IN  
APPENDIX A) REGARDING SPECIFIC  
REQUIREMENTS FOR YOUR STATE.**



STATE RULES ALSO APPLY FOR LAND APPLICATION OF DOMESTIC SEPTAGE



STATE RULES ALSO APPLY FOR LAND APPLICATION OF DOMESTIC SEPTAGE

FIGURE 8: COMPARISON OF FEDERAL AND SELECTED STATE REQUIREMENTS FOR THE LAND APPLICATION OF DOMESTIC SEPTAGE TO NON-PUBLIC CONTACT SITES			
	Federal	Minnesota <sup>1</sup>	Florida
PERMITS REQUIRED Issued By	No	No	Yes County
APPLICATION RATE Based on:	Crop Nitrogen Requirement	Crop Nitrogen Requirement and Other Nitrogen Impacts	Crop Nitrogen Requirement Max. 500 lbN/acre/yr or 30,000 gal/acre/year
Typical Rate (gallons/acre/year)	38,500	66,700 surface applied or 50,000 injected	Yes
Hydraulic Loading Limits Daily Application Rate Max.	No No	Yes 15,000 gal/acre <sup>2</sup> 10,000 gal/acre <sup>3</sup>	
RECORD KEEPING Reporting Required Years to Be Retained Required Information: Site Location Date of Application Time of Application Number of Acres Amount of Septage Applied Crop Grown Weather Conditions Certification Depth to Water Table Percent Vegetative Cover	Yes None Five Yes Yes Yes Yes Yes Yes No Yes No No	Yes None Not Specified Yes Yes Yes No Yes Yes No No Yes No	Yes Quarterly Yes Yes No Yes Yes Yes No Yes Yes
PATHOGEN REDUCTION	pH 12/2 hours and harvesting restrictions OR Site and harvesting restrictions	Optional	Optional
VECTOR ATTRACTION REDUCTION	pH 12/30 minutes OR Injection Or Incorporation	Optional	pH 12/2 hours

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2) Fair, G. M., J. C. Geyer, & D. A. Okum. 1968. Water Purification and Wastewater Treatment and Disposal In Water and Wastewater Engineering, Volume 2.

3) USEPA. 1984. Handbook: Septage Treatment and Disposal, EPA-625/6-84-009. CERL, Cincinnati, OH.

4) USEPA. "Field Guide for Septage Treatment and Disposal. In Draft." CERL, Cincinnati, OH.

5) USEPA. June 1993. Hauled Domestic Septage. Land Application of Domestic Septage: A Region 5 Introspective. Chicago, IL.

6) State of Florida Department of Health and Rehabilitative Services. March 17, 1992. Standards for Onsite Sewage Disposal System (Chapter 10D-6 FAC).

7) Minnesota Pollution Control Agency. October 1992 Draft. Land Application of Septage.

STATE RULES ALSO APPLY FOR LAND APPLICATION OF DOMESTIC SEPTAGE

FIGURE 8 Cont  
COMPARISON OF FEDERAL AND SELECTED STATE REQUIREMENTS FOR THE LAND APPLICATION OF DOMESTIC SEPTAGE TO NON-PUBLIC CONTACT SITES

	Federal	Minnesota <sup>1</sup>	Florida
CROP HARVESTING RESTRICTIONS Human Food Crops With Harvestable Portions That Touch the Soil Surface But Are Totally Above Ground Root Crops Other Food, Fibers or Feed Grazing Turf	14 Months	12 Months <sup>4</sup>  2 Years <sup>4</sup> 30 Days <sup>4</sup> 1 Year <sup>4</sup>	60 Days <sup>5</sup>  Not allowed 30 Days 30 Days
ACCESS RESTRICTION (fencing, posting, remoteness, etc.)	Required for Non-Stabilized	Required	Case Specific
SET BACK REQUIREMENTS Surface Waters	None	Varies with site slope <sup>8</sup> 1000 ft <sup>8</sup> 200 ft <sup>8</sup> 200 ft <sup>8</sup> 10 ft <sup>8</sup> 600 ft (200 ft trails) <sup>8</sup> 100 ft <sup>8</sup> 10 ft <sup>8</sup> Varies with site slope <sup>8</sup>	3000 ft-Class I and 200 ft-other 500 ft 300 ft 300 ft 75 ft None None None 200 ft
Public Water Supply Well Private Drinking Water Well Residence Property Boundary Recreational Area Intermittent Streams Road Right-of-Ways Holes and Channels	None None None None None None None None		
SOIL REQUIREMENTS Slope	None	0-6% (if surface spread) 0-12% (injected) 3 ft 3 ft	8%  2 ft-permeable None
Minimum Soil Depth Minimum Depth to Water Table Available Water Holding Capacity Permeability	None None None None	6 inches to bedrock or water table > .2/hr (if surface spread) inches < 6/hr in at least 1 horizon inches Free from flooding hazard	None None None
Flooding	None		None

Notes:  
1 = Minnesota's entered information is guidelines, not regulation.  
2 = Medium-textured soils.  
3 = Fine-textured soils.  
4 = Non-treated septage.  
5 = Use of septage not allowed on leafy vegetables or tobacco.  
6 = If septage remains on the soil surface for four months or longer.  
7 = If septage remains on the soil surface for less than four months.  
8 = Non-stabilized, surface spread septage.

APPENDIX A

STATE SEPTAGE COORDINATORS

ALABAMA

Sam Robertson  
Environmental Program Management  
Division  
Department of Health  
434 Monroe Street  
Montgomery, AL 36130-3017  
(205) 242-5007

CALIFORNIA

John Youngerman  
Regulatory Section  
Division of Water Quality  
State Water Resources Control Board  
P.O. Box 944213  
Sacramento, CA 94244-2130  
(916) 657-1013

ALASKA

Deena Henkins  
Wastewater and Water  
Treatment Section  
Division of Environmental Quality  
Department of Environmental  
Conservation  
410 Willoughby Avenue  
Juneau, AK 99801  
(907) 465-5312

COLORADO

Phil Hegeman  
Municipal Sludge  
Management Program  
Water Quality Control Division  
Department of Health  
4300 Cherry Creek Drive South  
Glendale, CO 80222-1530  
(303) 692-3598

ARIZONA

Krista Gooch  
Office Of Waste Programs  
Solid Waste Unit  
Department of Environmental Quality  
2501 North 4th Street  
Suite 14  
Flagstaff, AZ 86004  
(602) 773-9285

CONNECTICUT

Frank Schaub  
On-Site Sewage Department  
State Health Services  
150 Washington Street  
Hartford, CT 06106  
(203) 566-1259

ARKANSAS

Terry Brumelav  
Environmental Health Protection  
Bureau of Environmental  
Health Services  
Department of Health  
State Health Building  
4815 West Markham Street  
Little Rock, AR 72205  
(501) 661-2171

DELAWARE

Ron Graber  
Dept. of Natural Resources  
and Environmental Control  
Division of Water Resources  
Waste Utilization Program  
89 Kings Highway  
P.O. Box 1401  
Dover, DE 19903  
(302) 739-5731





STATE SEPTAGE COORDINATORS

DISTRICT OF COLUMBIA

Dr. Mohfin R. Siddique  
DCRA Environmental  
Regulation Administration  
Water Resources Management  
Division  
2100 Martin Luther  
King, Jr. Avenue S.E.  
Suite 203  
Washington, DC 20020  
(202) 404-1120

FLORIDA

Sharon Sawicki  
Bureau of Water Facilities  
Planning and Regulation  
Domestic Wastewater Section  
Department of Environmental  
Regulation  
Twin Towers Office Building  
2600 Blairstone Road  
Tallahassee, FL 32399-2400  
(904) 488-4524

Dr. Kevin Sherman  
HRS Environmental Health (HSEH)  
Department of Health and  
Rehabilitative Services  
1317 Winewood Boulevard  
Tallahassee, FL 32399-0700  
(904) 488-4070

GEORGIA

Ide Oke  
Department of Human Resources  
Division of Public Health  
#2 Peachtree Street  
5th Floor Annex  
Atlanta, GA 30303  
(404)656-2454

HAWAII

Dennis Tuland  
Construction Grants Program  
Wastewater Branch Department  
of Health  
5 Waterfront Plaza, Suite 250-D  
500 Ala Moana Boulevard  
Honolulu, HI 96813  
(808) 586-4294

IDAHO

Barry Burnell  
Division of Environmental Quality  
Department of Health and Welfare  
1410 North Hilton  
Boise, ID 83706  
(208) 334-5860

INDIANA

Alan Dunn  
Department of Health,  
Sanitary Engineering  
1330 West Michigan Street  
Indianapolis, IN 46202-2874  
(317) 633-0160

ILLINOIS

Doug Ebelherr  
Private Sewage Disposal Program  
Department of Public Health  
525 West Jefferson Street  
Third Floor  
Springfield, IL 62761  
(217) 782-5830

IOWA

Billy Chen  
Wastewater Bureau  
Department of Natural Resources  
Wallace Building  
900 East Grand Avenue  
Des Moines, IA 50309  
(515) 281-4305

KANSAS

Rodney Geisler, and Julie Greene  
Department of Health  
and Environment  
Building 740  
Forbes Field  
Topeka, KA 66620  
(913) 296-5527

KENTUCKY

Ken Wade  
Environmental Sanitation Branch  
Division of Local Health  
Cabinet for Human Resources  
275 East Main Street  
Frankfurt, KY 40621  
(502) 564-4856

LOUISIANA

Bijan Sharafkhani  
Solid Waste Division  
Department of Environmental Quality  
P.O. Box 82178  
Baton Rouge, LA 70884-2178  
(504)765-0249

MAINE

James Pollock  
Department of Environmental  
Protection  
Bureau of Hazardous Materials  
and Solid Waste Control  
Division of Waste Facility Regulation  
State House Station 17  
Augusta, ME 04333  
(207) 287-2651

MARYLAND

Dr. Simin Tirgari, Chief  
Sewage Sludge/Compliance Division  
Hazardous and Solid Waste  
Management Administration  
Department of the Environment  
2500 Broening Highway  
Baltimore, MD 21224  
(410) 631-3318

MASSACHUSETTS

Rick Dunn  
Department of Environmental  
Protection  
Division of Water Pollution Control  
1 Winter Street  
Boston, MA 02108  
(617) 556-1130

MICHIGAN

Joan Peck  
Groundwater Section of Waste  
Management  
Department of Natural Resources  
P.O. Box 30241  
Lansing, MI 48909  
(517) 335-3383

STATE SEPTAGE COORDINATORS



STATE SEPTAGE COORDINATORS

MINNESOTA

Mark Wespelal  
Non-Point Source Section  
Division of Water Quality  
Pollution Control Agency  
520 Lafayette Road  
Saint Paul, MN 55155  
(612) 296-9322

NEBRASKA

Steve Goans  
Water Quality Division  
Department of Environmental Quality  
P.O. Box 98922-8922  
Statehouse Station  
Lincoln, NE 68509-8922  
(402) 471-4220

MISSISSIPPI

Glen Odom  
Bureau of Pollution Control  
P.O. Box 10385  
Jackson, MS 39289-0385  
(601) 961-5159

NEW HAMPSHIRE

Selina Makofsky  
Water Supply and Pollution  
Control Division  
Sludge and Septage Management  
Department of Environmental Services  
P.O. Box 95  
6 Hazen Drive  
Concord, NH 03301  
(603) 271-2457

Ralph Turnbo  
General Sanitation Branch  
Department of Health  
P.O. Box 1700  
Jackson, MS 39215-1700  
(601) 960-7690

NEW JERSEY

Mary Jo M. Aiello  
Bureau of Pretreatment and Residuals  
Department of Environmental  
Protection  
CN-029  
Trenton, NJ 08625  
(609) 633-3823

MISSOURI

Ken Arnold  
Unit Chief of Land Application  
Water Pollution Control Program  
Department of Natural Resources  
P.O. Box 176  
Jefferson City, MO 65102  
(314) 751-9155

NEW MEXICO

Delbert Bell  
Groundwater Bureau  
Environmental Department  
P.O. Box 26110  
1190 St. Francis Drive  
Santa Fe, NM 87502-6110  
(505) 827-2788

MONTANA

Scott Anderson  
Water Quality Bureau  
Department of Health and  
Environmental Sciences  
Cogswill Building, Room A206  
Helena, MT 59620  
(406) 444-2406

NEVADA

Mahmood Azad  
Bureau of Water Pollution Control  
Department of Conservation and  
Natural Resources  
Division of Environmental Protection  
Capitol Complex  
333 West Nye Lane  
Carson City, NV 89710  
(702) 687-5870

OHIO

Tom Grigsby  
Department of Health  
246 North High Street  
P.O. Box 7969  
Columbus, OH 43266-0118  
(614) 466-1390

OKLAHOMA

Dan Hodges  
Water Quality Services  
Department of Health  
1000 N.E. 10th Street  
Oklahoma City, OK 73117-1299  
(405) 271-5205

NEW YORK

Ly Lim  
Residuals Management Section  
Bureau of Resource Recovery  
Division of Solid Waste  
Department of Environmental  
Conservation  
50 Wolf Road  
Albany, NY 12233-4013  
(518) 457-7336

OREGON

Mark Ronayne  
Department of Environmental Quality  
Water Quality Division  
Municipal Waste Section  
811 S.W. 6th Avenue  
Portland, OR 97204  
(503) 229-6442

NORTH CAROLINA

Ted Lyon  
Department of Environment, Health  
and Natural Resources  
Division of Solid Waste Management  
Solid Waste Section  
Septage Management Branch  
P.O. Box 27687  
Raleigh, NC 27611  
(919) 733-0692

PENNSYLVANIA

Thomas Woy  
Department of Environmental  
Resources  
Division of Municipal &  
Residual Waste  
Bureau of Waste Management  
P.O. Box 8472  
Harrisburg, PA 17105-8472  
(717) 787-7381

NORTH DAKOTA

Gary Reed  
Division of Municipal Facilities  
Department of Health  
1200 Missouri Avenue  
Bismark, ND 58505  
(701) 221-5209

# STATE SEPTAGE COORDINATORS

## RHODE ISLAND

David Chopy  
Division of Water Resources  
Department of Environmental  
Management  
291 Promenade Street  
Providence, RI 02908-5657  
(401) 277-3961

## SOUTH CAROLINA

Dick Hatfield, Director  
On Site Wastewater Management  
Division  
Bureau of Environmental Health  
Department of Health and  
Environmental Control  
2600 Bull Street  
Columbia, SC 29201  
(803) 935-7835

## SOUTH DAKOTA

Bill Gyer  
Division of Environmental Regulation  
Department of Environment and  
Natural Resources  
523 East Capital Street  
Pierre, SD 57501-3181  
(605) 773-3351

## TENNESSEE

Steve Morris  
Division of Groundwater Protection  
Department of Environment  
and Conservation  
10th Floor, LNC Tower  
401 Church Street  
Nashville, TE 37243-1533  
(615) 532-0774

## TEXAS

Phyllis Wilbanks  
Municipal Permits  
Texas Water Commission  
P.O. Box 13087  
Austin, TX 78711-3087  
(512) 463-8169

## UTAH

John Kennington  
Division of Water Quality  
Department of Environmental Quality  
P.O. Box 144870  
Salt Lake City, UT 84114-4870  
(801) 538-6146

## VERMONT

George Desch, Chief  
Agency of Natural Resources  
Department of Environmental  
Conservation  
Division of Solid Waste Management  
Residuals Section  
103 South Main Street  
Waterbury, VT 05671-0407  
(803) 244-7831

## VIRGINIA

Robert W. Hicks  
Office of Environmental  
Health Services  
Department of Health  
Main Street Station, Suite 117  
P.O. Box 2448  
Richmond, VA 23218  
(804) 786-3559

# STATE SEPTAGE COORDINATORS

## WASHINGTON

Kyle Dorsey  
Department of Ecology  
P.O. Box 47600  
Mailstop 7600  
Olympia, WA 98504-7600  
(206) 459-6307

## WEST VIRGINIA

Ron Forren, Director  
Public Health Sanitation Division  
Office of Environmental Health  
Services  
815 Quarrier Street, Suite 418  
Charleston, WV 25305  
(304) 558-2981

## WISCONSIN

Robert Steindorf  
Bureau of Wastewater Management  
Division of Environmental Quality  
101 South Webster Street GEF II  
P.O. Box 7921  
Madison, WI 53707-7921  
(608) 266-0449

## WYOMING

Gary Steele  
Water Quality Division  
Wyoming Department of  
Environmental Quality  
Herschler Building, 4th Floor West  
122 West 25th Street  
Cheyenne, WY 82002  
(307) 777-7075

## PUERTO RICO

Victor Matta, Section Chief  
Non-Hazardous Solid Waste Section  
Land Pollution Control Area  
Environmental Quality Board  
P.O. Box 11488  
Santurce, Puerto Rico 00910  
(809) 767-8124

## VIRGIN ISLANDS

Leonard G. Reed, Jr.,  
Assistant Director  
Division of Environmental Protection  
Department of Planning  
and Natural Resources  
45 A. Nisky Center, Suite 231  
Saint Thomas, Virgin Islands 00802  
(809) 774-5416

REGIONAL SEPTAGE COORDINATORS

REGION 1

Thelma Hamilton  
Water Management Division  
Wastewater Treatment  
Management Branch  
John F. Kennedy Federal Building  
Mail Stop WMC  
Boston, MA 02203  
(617) 565-3569

REGION 2

Alia Rontaeal  
NY-NJ Municipal Programs Branch  
Water Management Division  
26 Federal Plaza, Room 837  
New York, NY 10278  
(212) 264-8663

REGION 3

Ann Carkhuff  
Permits Enforcement Branch  
Program Development Section  
Water Management Division  
Mail Stop 3WM55  
841 Chestnut Street  
Philadelphia, PA 19107  
(215) 597-9406

REGION 4

Vince Miller  
Permits Section  
Water Permits and Enforcement Branch  
Municipal Facilities Branch  
Water Management Division  
345 Courtland Street, N.E.  
Atlanta, GA 30365  
(404) 347-3633

REGION 5

John Colletti  
NPDES Permit Section  
Water Quality Branch  
Water Management Division  
5 WQP-16J  
77 West Jackson Boulevard  
Chicago, IL 60604  
(312) 886-6106

REGION 6

Gene Wossum  
Water Management Division  
1445 Ross Avenue  
Dallas, TX 75202  
(214) 655-7173

REGION 7

John Dunn  
Water Management Division  
726 Minnesota Avenue  
Kansas City, KA 66101  
(913) 551-7594

REGION 8

Robert Brobst  
NPDES Permit Section  
Water Management Division  
(Mail Stop 8WM-C)  
999 18th Street  
Denver, CO 80202-2466  
(303) 293-1627

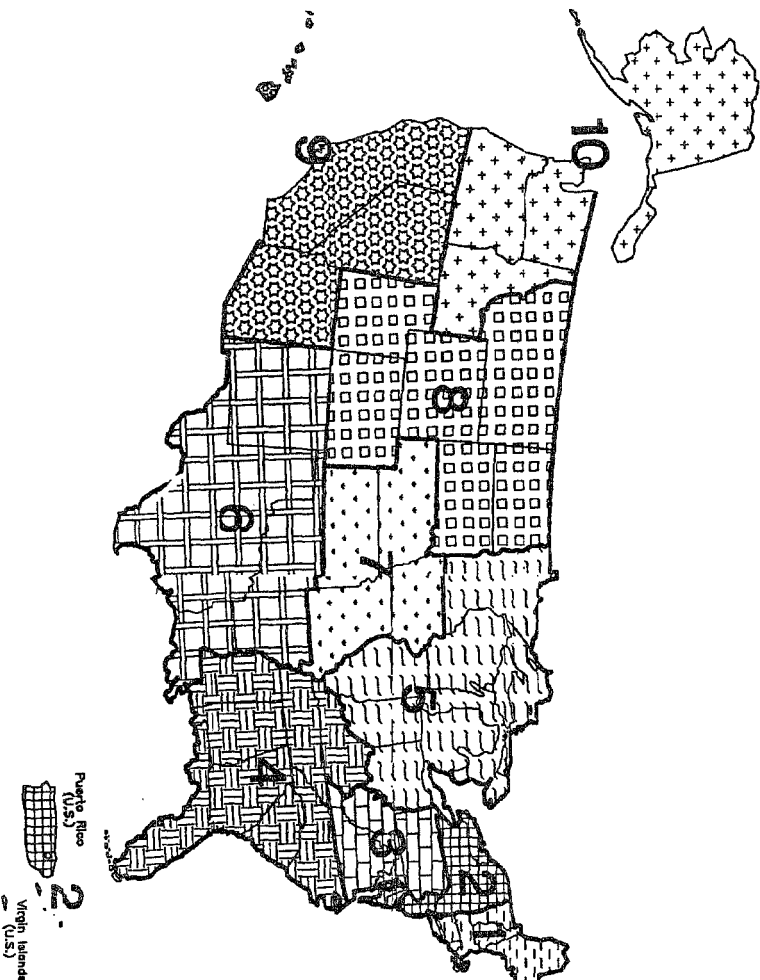
REGION 9

Lauren Fondahl  
Pretreatment Program and  
Compliance Section  
Permits and Compliance Branch  
Water Management Division  
(Mail Stop w-5-2)  
75 Hawthorne Street  
San Francisco, CA 94105  
(415) 744-1909

REGION 10

Dick Hetherington  
Water Permits Section  
Wastewater Management and  
Enforcement Branch  
Water Division  
Mail Stop WD134  
1200 6th Avenue  
Seattle, WA 98101  
(206) 553-1941

U.S. EPA REGIONS



ALPHABETICAL LISTING OF STATES

Region - State	Region - State	Region - State	Region - State
4 - Alabama	5 - Indiana	9 - Nevada	4 - Tennessee
10 - Alaska	7 - Iowa	1 - New Hampshire	6 - Texas
9 - Arizona	7 - Kansas	2 - New Jersey	8 - Utah
6 - Arkansas	4 - Kentucky	6 - New Mexico	1 - Vermont
9 - California	6 - Louisiana	2 - New York	3 - Virginia
8 - Colorado	1 - Maine	4 - North Carolina	10 - Washington
1 - Connecticut	3 - Maryland	8 - North Dakota	3 - West Virginia
3 - Delaware	1 - Massachusetts	5 - Ohio	5 - Wisconsin
3 - District of Columbia	5 - Michigan	6 - Oklahoma	8 - Wyoming
4 - Florida	5 - Minnesota	10 - Oregon	9 - American Samoa
4 - Georgia	4 - Mississippi	3 - Pennsylvania	9 - Guam
9 - Hawaii	7 - Missouri	1 - Rhode Island	2 - Puerto Rico
10 - Idaho	8 - Montana	4 - South Carolina	2 - Virgin Islands
5 - Illinois	7 - Nebraska	8 - South Dakota	

APPENDIX B

CHEMICAL AND PHYSICAL CHARACTERISTICS OF DOMESTIC SEPTAGE VS. SEWAGE SLUDGE

Parameter	Concentration mg/kg (dry weight basis)		
	Domestic Septage <sup>1</sup>	Sewage Sludge <sup>2</sup>	Pollutant Concentration Limit (PCL) <sup>3</sup>
Arsenic	4	10	41
Cadmium	3	7	39
Chromium	14	120	1200
Copper	140	740	1500
Lead	35	130	300
Mercury	0.15	5	17
Molybdenum	—	4	18
Nickel	15	43	420
Selenium	2	5	100
Zinc	290	1200	2800
Nitrogen as N	2%	2 - 7%	—
Phosphorus as P	< 1%	1 - 3%	—
pH	6 - 7	5 - 8	—
Grease	6 - 12%	2000mg/l <sup>4</sup>	—
Biochemical Oxygen Demand (BOD <sub>5</sub> )	6,480 mg/l	3 - 35%	—
Total Solids (as normally spread)	3.4%		

Notes:

- 1: Domestic septage characteristics are from Field Guide to Septage Treatment and Disposal.
- 2: Sewage sludge characteristics are from the National Sewage Sludge Survey, and Wastewater Engineering: Treatment/Disposal/Reuse.
- 3: Pollutant Concentration Limits are from Table 3 of the Standards for the Use or Disposal of Sewage Sludge (40 CFR Part 503). These regulatory limits apply to sewage sludge, not domestic septage, but is used for comparison purposes here. Sewage sludges meeting these limits can be used without tracking the cumulative amount of metals applied to the land.
- 4: BOD<sub>5</sub> varies greatly among sewage sludges.



APPENDIX C

SAMPLE METHODS FOR RECORD KEEPING

There are two examples of ways that might be helpful to you for keeping your records. The first of these examples is for recording information that pertains to the different fields onto which you apply domestic septage.

The second is an example of a daily log that might be kept in the truck as domestic septage is pumped. A sample has also been filled in as an example of the type of information you might actually record.

The diagram illustrates three overlapping forms used for record keeping. The top form is a simple rectangular box. The middle form is a rectangular box with a header section containing several small rectangular boxes for text entry. The bottom form is a large rectangular box containing a grid of 10 columns and 10 rows, with some cells containing horizontal lines for text entry.

APPENDIX C-1

EXAMPLE RECORD KEEPING OF GENERAL INFORMATION

SITE: \_\_\_\_\_  
REPORTING YEAR: \_\_\_\_\_  
FIELD NUMBER: \_\_\_\_\_  
CROP(S) and EXPECTED YIELD: \_\_\_\_\_

NITROGEN REQUIREMENT OF CROP: \_\_\_\_\_ pounds N per Year  
ANNUAL APPLICATION RATE (AAR): \_\_\_\_\_ gallons per acre per Year

$$AAR \text{ (gallons/acre/year)} = \frac{\text{Nitrogen Requirement of Crop}}{0.0026}$$

HARVESTING SCHEDULE: \_\_\_\_\_

DATE OF APPLICATION TO SITE	ACREAGE OF SITE TO WHICH SEPTAGE WAS APPLIED	GALLONS APPLIED TO SITE TODAY	TOTAL GALLONS APPLIED YEAR TO DATE

I certify under penalty of law, that the pathogen requirement [insert alternative 1 or 2] and the vector attraction reduction requirement [insert alternative 1, 2 or 3] have/have not [circle one] been met. This determination has been made under my direction and supervision in accordance with the system designed to assure that qualified personnel properly gather and evaluate the information used to determine that the pathogen requirements and vector attraction reduction requirements have been met. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment.

Signature: \_\_\_\_\_ Title: \_\_\_\_\_  
Printed Name: \_\_\_\_\_

APPENDIX C-2

DRIVER'S LOG

Driver: \_\_\_\_\_

Source	Date	Septage Amt. (Gallons)	Type of Alkaline Material Used	Amount (pounds)	How Mixed	Initial pH	pH after 30 Minutes	How Applied & Site/Field/Crop

Driver: Sam Stevens

Source	Date	Amount (Gallons)	Type of Alkaline Material Used	Amount (pounds)	How Mixed	Initial pH	pH after 30 min.	How Applied & Site/Field/Crop
Wayside Trailer Park	8-8-93	3000	N O N E					Knorr, Stump Rd Pasture, injected Corn, 125 bu
S. Arnold 445 Spring Wayside	8-8-93	1500	N O N E					Knorr, Stump Rd Corn, 150 bu Plow in 6 hours
T. Jones East Main Shadyside	8-9-93	1500	N O N E					Shadyside Wastewater Treatment Works Shadyside, MD

DRIVER'S LOG: SAMPLE #1



Driver: Ed Warren

Source	Date	Amount of Septage (Gallons)	Type of Alkaline Material Used	Amount of Lime (pounds)	How Mixed	Initial pH	pH after 30 min.	How Applied & Site/Field/Crop
H. Toms 2331 Webster Camp Springs	7-8-93	2000	hydrated lime	50	slurry bled	12	12	Babett East Hwy 2 Corn 100 bu, plow Camp Springs, MD
Grease Trap at Mel's Diner	7-8-93	300	N O N E					County Landfill
P. Saul 2335 Webster Camp Springs	7-9-93	1500	hydrated lime	35	slurry bled	12	12	Babett East Hwy 2 Corn 100 bu, plow Camp Springs, MD
Napier Apts. Camp Springs	7-9-93	3500	hydrated lime	85	slurry bled	12	12	Babett East Hwy 2 Corn 100 bu, plow Camp Spring, MD

DRIVERS LOG: SAMPLE #2

APPENDIX D

TYPES AND SOURCES OF SAFETY AND pH TESTING EQUIPMENT

Safety items needed:

- 1. Safety Goggles
- 2. Emergency Eyewash Station
- 3. Half-mask respirator with appropriate cartridge
- 4. Shoulder length fully coated neoprene gloves
- 5. Carbon dioxide fire extinguisher

Some sources of these items are:

Direct Safety Company 7815 South 46th Street Phoenix, AZ 85044 (800) 528-7405 (800) 366-9662 - fax	Prendergast Safety Equipment Co. 8400 Enterprise Avenue Philadelphia, PA 19153 (215) 937-1900 (215) 365-7527 - fax
--	--

pH Indicator Paper and Meter Sources:

Hach Company 5600 Lindbergh Drive Loveland, CO 80539 (800) 227-4224	Fischer Scientific 711 Forbes Avenue Pittsburgh, PA 15219-9919 (800) 242-3772
Lab Safety Supply P.O. Box 1368 Janesville, WI 53547-1368 (800) 356-0783	Thomas Scientific P.O. Box 99 Swedesboro, NJ 08085 (800) 345-2100 (609) 467-3087 - fax

Brands of pH meters include Oakton, Fischer and Corning. Suitable meters cost between \$50 and \$150 depending on features. Indicator paper is a much cheaper method of monitoring pH. A 50 foot roll of pH paper costs under \$10.

**CAUTION:** Trade names and vendors are provided for the benefit of the reader and do not imply endorsement by the U.S. Environmental Protection Agency.

APPENDIX E

EXAMPLE STATE RULES FOR LAND APPLICATION OF DOMESTIC SEPTAGE

Appendix E contains examples of rules and guidelines from two States for governing the use or disposal of septage. The two examples presented are rules from Florida and guidelines from Minnesota. These examples are only given as an indication of how some State rules currently look and how they differ from each other and from the Federal rule. In no way are these examples meant to serve as a model of how a State rule or guideline should look.

THESE AND OTHER STATE REGULATIONS  
MAY CHANGE AT ANY TIME.

YOU SHOULD NOT RELY ON THIS SUMMARY  
OF THE FLORIDA AND MINNESOTA RULES TO  
ENSURE YOU ARE IN COMPLIANCE WITH THEIR  
SEPTAGE MANAGEMENT REQUIREMENTS.

FLORIDA

Regulations and Restrictions

Florida regulations define septage as "a mixture of sludge, fatty materials, human feces, and wastewater removed during the pumping of an on-site sewage disposal system." Unlike the Federal Part 503 Regulation, Florida does not include the contents of portable toilets or holding tanks. The Florida regulation requires permits for both handling and disposing of septage. These permits are issued by the Department of Health and Rehabilitative Services (HRS) of each county.

EXAMPLE STATE RULES FOR LAND APPLICATION OF DOMESTIC SEPTAGE

FLORIDA Con't

The Florida regulation prescribes when, where, and how much septage should be applied to land. In general, these restrictions are more limiting than the Federal Part 503 regulation. Only septage that has been properly treated by lime stabilization may be land applied. The Florida regulation defines stabilization as raising the pH of the septage to at least 12 for a minimum of 2 hours.

Other Florida restrictions are as follows:

1. Septage may not be spread on land where frequent public access is likely to occur, such as playgrounds, parks, golf courses, lawns and hospital grounds. Suggested suitable lands for septage application include sod farms, pasture lands, forests, highway shoulders and medians, plant nurseries, land reclamation projects and farmland.
2. When applied to areas without vegetative cover, septage must be incorporated into the soil within 48 hours.
3. Pasture land may not be grazed for 30 days following application of septage.
4. Crops may not be harvested for hay or silage for 30 days following application of septage.
5. Human food chain crops other than hay, silage and orchard crops, may not be harvested for 60 days following application of septage.
6. Vegetables and fruits which come into contact with the soil surface may not be grown for a minimum of 18 months following application of septage.

EXAMPLE STATE RULES FOR LAND APPLICATION OF DOMESTIC SEPTAGE

FLORIDA Con't

7. Septage may not be applied to land used for the cultivation of tobacco, root crops, leafy vegetables or vegetables to be eaten raw.
8. No more than 500 pounds of nitrogen may be applied to each acre in any 12 month period.
9. Septage may not be land applied within 3000 feet of any Class I water body or Outstanding Florida Water. For surface waters of lesser quality (except irrigation canals and ponds), a buffer zone of 200 feet must be maintained. No buffer is required around irrigation waters that are located entirely on the land application site and do not flow off the site.
10. Septage may not be applied within 500 feet of any shallow public water supply wells, nor closer than 300 feet to any private drinking water supply well.
11. At the time of septage application, a minimum of 24 inches of unsaturated soil above the ground water table must be present.
12. Septage may not be applied during rain events when runoff might occur.
13. Septage application area must have buffer zones and stormwater management structures with a capacity to hold runoff during flash floods. Florida also requires on-site facilities for storing septage during periods of poor weather and equipment failures.



EXAMPLE STATE RULES FOR LAND APPLICATION OF DOMESTIC SEPTAGE

FLORIDA Con't

- 14 The slope of the land application area may not be more than eight percent and a layer of permeable soil at least two feet thick should cover the surface.
- 15 Land used for septage application may not contain any hole or channel (such as subsurface fractures, solution cavities, sink holes, or excavated core holes) which would allow the septage to contaminate the groundwater. Also, septage may not be applied within a 200 foot buffer from such geologic formations or features.
- 16 Septage may not be applied within 300 feet of any dwelling.
17. Septage may not be applied within 75 feet of the property boundary or any drainage ditches.

An agricultural use plan (AUP) for the septage application site must be prepared, and reviewed by HRS. An AUP describes how stabilized septage will be used as part of planned farming operations. It includes methods of application, crops to be grown and their fertilizer requirements, erosion control measures, access control measures, harvesting periods and information on the soil and geological conditions at the site which could limit its use for septage application. An AUP must be updated every year.

EXAMPLE STATE RULES FOR LAND APPLICATION OF DOMESTIC SEPTAGE

FLORIDA Con't

Reporting and Record Keeping

The reporting and record keeping requirements of the Florida regulations are very similar to those in the Federal rule. Records must be maintained for five years and made available to State inspectors upon request.

The following information must be included in the records:

1. Dates of septage application;
2. Weather conditions during application;
3. Location of septage application site;
4. Amounts of septage applied;
5. Acreage of the area where septage was applied;
6. The pH of the stabilized septage applied;
7. Depth to the water table from the soil surface when septage applied; and,
8. Percentage of total application area covered by plant growth.

In contrast to the Federal regulation, Florida requires that a quarterly report be submitted to the HRS summarizing the total volume of septage applied.

EXAMPLE STATE RULES FOR LAND APPLICATION OF DOMESTIC SEPTAGE

MINNESOTA

Regulatory Overview

Minnesota's septage management program is more informal than either the Federal or State of Florida programs. The Minnesota Pollution Control Agency has issued a document entitled Land Application of Septage which explains the State's guidelines for land applying domestic septage. The Minnesota definition of septage includes the solids and liquids removed during the periodic maintenance of septic, aerobic or holding tanks, dosing chambers, pit privies or chemical toilets. Industrial wastes are not covered by this guidance publication; these can only be land applied under the terms of a solid waste disposal permit. No permits are required in Minnesota to apply domestic septage. No formal regulations have been adopted to cover this practice.

Figure E-1: MINNESOTA SEPTAGE APPLICATION SETBACKS (in feet)

Item	Surface Spread		Incorporated Within 2 Hrs	Incorporated Within 24 Hrs	Injected
	lime treated	not treated			
Occupied Dwellings Recreational Area, Residential Development & Commercial Development	200	200	100	200	100
	600	600	300	600	300
Municipal Well	1000	1000	1000	1000	1000
Private Well	200	200	200	200	200
Property Lines & Road	10	10	10	10	none
Right of Ways					
Intermittent Streams	100	100	25	100	25

EXAMPLE STATE RULES FOR LAND APPLICATION OF DOMESTIC SEPTAGE

MINNESOTA  
Con't

The Minnesota guidance document provides the following controls for land application of domestic septage:

1. Setbacks: These vary with the method of applying the septage, the time of year and if the septage was stabilized using alkali treatment. Figure E-1 presents the numerous set backs required in Minnesota. In addition to these, the Minnesota guidance document includes setbacks for surface waters, drainage tile inlets and sink holes. These setbacks vary with the slope of the site, the method of application and the time of year.

2. Slope restrictions: These are based on the method used to apply the septage and whether the soil is frozen (see Figure E-2). Minnesota does not prohibit application of septage on frozen grounds but has limited the slope of the land to be used during the winter months. A ban on applications on frozen grounds in this area of the country would severely limit the use of land application and would force development of considerable storage capacity.

Figure E-2: MINNESOTA LAND APPLICATION OF SEPTAGE SLOPE RESTRICTIONS

	Surface Applied	Injected or Incorporated Within 24 Hours
Unfrozen Soil	6% slope or less	12% slope or less
Frozen Soil	2% slope or less	not possible

MINNESOTA  
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- 3 Soil criteria: Minnesota has developed several characteristics for determining a suitable soil for seepage application. These are listed in Figure E-3.

<p>Figure E-3: MINNESOTA REQUIREMENTS FOR SUITABLE SOIL FOR LAND APPLICATION OF SEPTAGE</p> <p>Medium to fine textured soils (no sandy, peaty or mucky surface textures)</p> <p>Minimum depth to watertable of three feet through natural or artificial drainage</p> <p>Minimum depth to bedrock of three feet</p> <p>Minimum of 6 inches of available water holding capacity between application depth and the watertable and bedrock</p> <p>Free from flooding hazard</p> <p>At least one soil horizon in the upper five feet must have a permeability of less than six inches per hour.</p> <p>If seepage is to be surface applied (rather than injected), the soil must have a surface permeability greater than 0.2 inches per hour.</p>
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4. Public access controls: The guidance document recommends either fencing or posting seepage application sites to avoid the possibility of uninformed people contacting seepage that has been applied. Remote sites are not affected by this recommendation.

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- 5 Harvest limitations: These are much simpler than the harvesting options provided in the Federal regulation. In Minnesota, seepage can only be applied to hay when the leaf area is minimal (primarily early spring, late fall and within one week following cutting). Hay should not be harvested for one month following application of seepage. Animals should not be grazed on pasture where seepage has been spread or injected for one year following application. Crops with edible portions that may come in contact with the soil can not be planted for one year following application of seepage. Root crops or crops for direct human consumption can not be planted for two years after application. No food chain crops should be planted within 30 days of seepage application. These waiting periods are based on non-treated seepage.

- 6 Application rates: Minnesota application rates for seepage are based on the nitrogen required by the crop grown, residual soil nitrogen, input of nitrogen from the previous crop, and input of nitrogen from commercial fertilizers and manures. The guidelines also contain daily hydraulic loading limits. Also, seepage can not be applied when it is raining.

EXAMPLE STATE RULES FOR LAND APPLICATION OF DOMESTIC SEPTAGE

MINNESOTA  
Con't

Regarding stabilization, Minnesota recommends that domestic septage, regardless of application method, be mixed with alkaline material to raise its pH to at least 12 and maintain that pH for 30 minutes before it is land applied. If the septage is not stabilized, injection is the suggested method of application. Also, the soil pH at application sites should be maintained at 6.5 to reduce the potential for uptake of metals by plants.

Reporting and Record Keeping

Minnesota has no reporting or record keeping requirements for land application of domestic septage. However, the Minnesota guidelines do contain charts to aid the land applier in keeping track of relevant information.

COMMENTS REQUESTED ON THIS GUIDE

Please let us know what you think about this document. Please offer any suggestions you might have for future improvement using this comment sheet. Please send your comments to us at the U.S. EPA, Office of Wastewater Enforcement and Compliance, Municipal Technology Branch, (4204), Washington, DC 20460.

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US ENVIRONMENTAL PROTECTION AGENCY  
OFFICE OF WASTEWATER ENFORCEMENT AND COMPLIANCE  
MUNICIPAL TECHNOLOGY BRANCH  
(4204)  
WASHINGTON, DC 20460

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